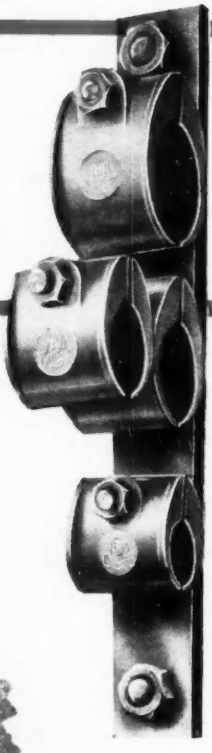
ELECTRICAL TIMES

THURSDAY
29 MAY
1952
NINEPENCE

Simplify cable erection with BICC CLAW-TYPE CLEATS



BICC Claw-Type Cleats are a new invention, devised by our engineers, to make cable installation rapid and easy.

Light and strong, they consist of interchangeable units made from a corrosion-resisting alloy.

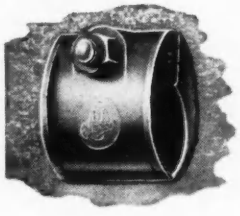
They minimise the need for special steelwork;

Are compact and space saving;

Solve cleating problems in difficult situations;

Provide for extensions and adaptations with minimum disturbance of existing cables,

And allow maximum accessibility to cables on multi-cable runs.



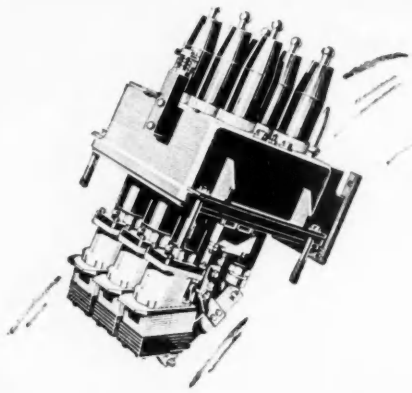
For further information, send for Publication 287

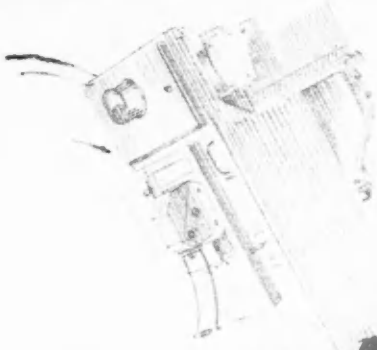
B.I. Callender's

CLAW-TYPE CABLE CLEATS

(Patent applied for)

BRITISH INSULATED CALLENDER'S CABLES LIMITED
NORFOLK HOUSE, NORFOLK STREET, LONDON, W.C.2





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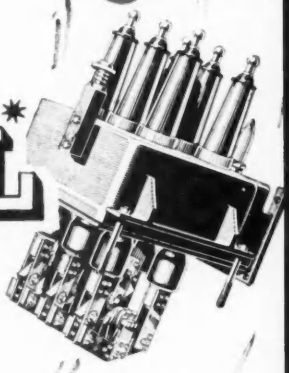
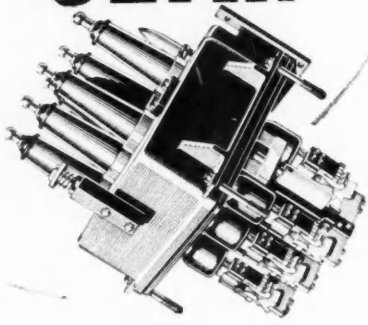
WITH J. & P.

TRINAL*

GEAR





★ *The "three-fold" range that can save you pounds and pounds through interchangeability. Details in Publication SG. 86.*

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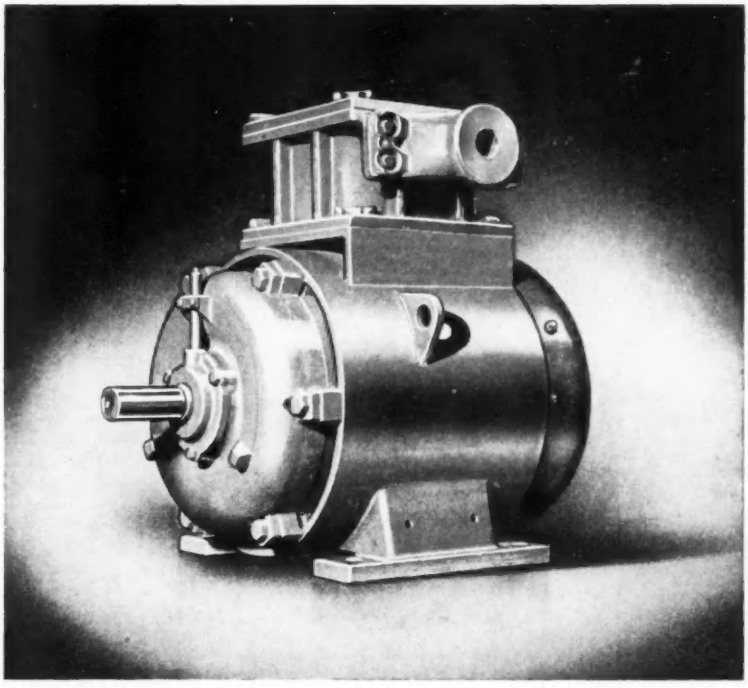

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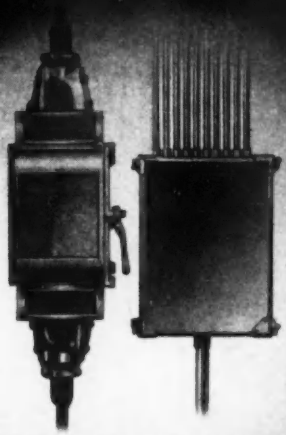

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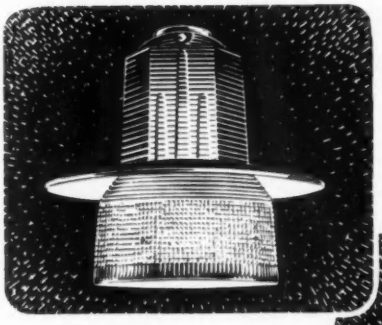

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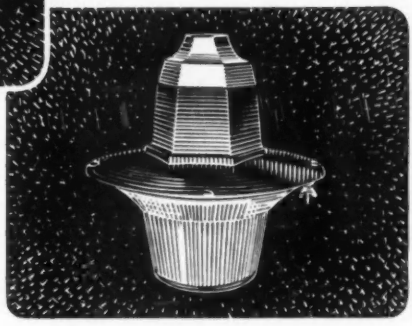

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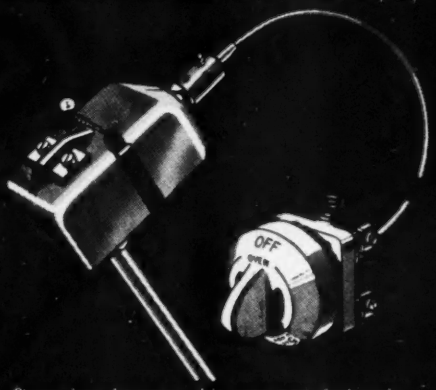

Some just happen; this one was designed . . . . . designed to cut out the snags . . . . designed for minimum maintenance . . . . designed (note the flexible drive) for easy fitting . . . . designed — and made — by people who know.

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Member of the A.E.I. Group of Companies

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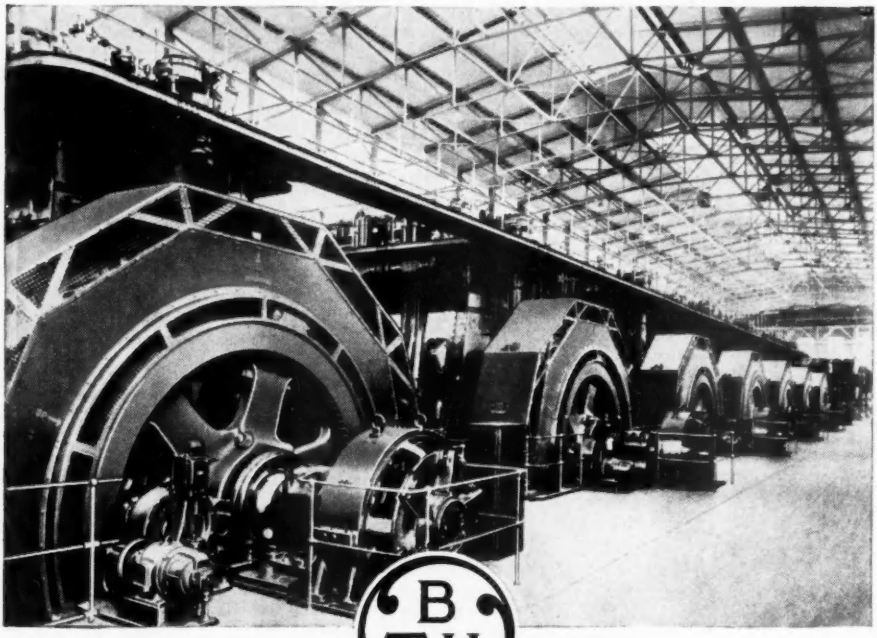

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for any kind of prime mover

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Alternators in which the whole of the flywheel effect required by the set is incorporated in the rotor, can be supplied. Machines of this type are illustrated —seven BTH 2,500-kVA., 6,900-volt, 3-phase, 40-cycle, 160-r.p.m. flywheel type alternators installed in Central Power Station of Western New South Wales Electric Power Pty., Ltd., Australia.

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The gear was supplied from the stock of one of our accredited distributors.

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1000 kVA and 500 kVA, 3 phase transformers, voltage ratio 3300/433, connected delta/Interstar.

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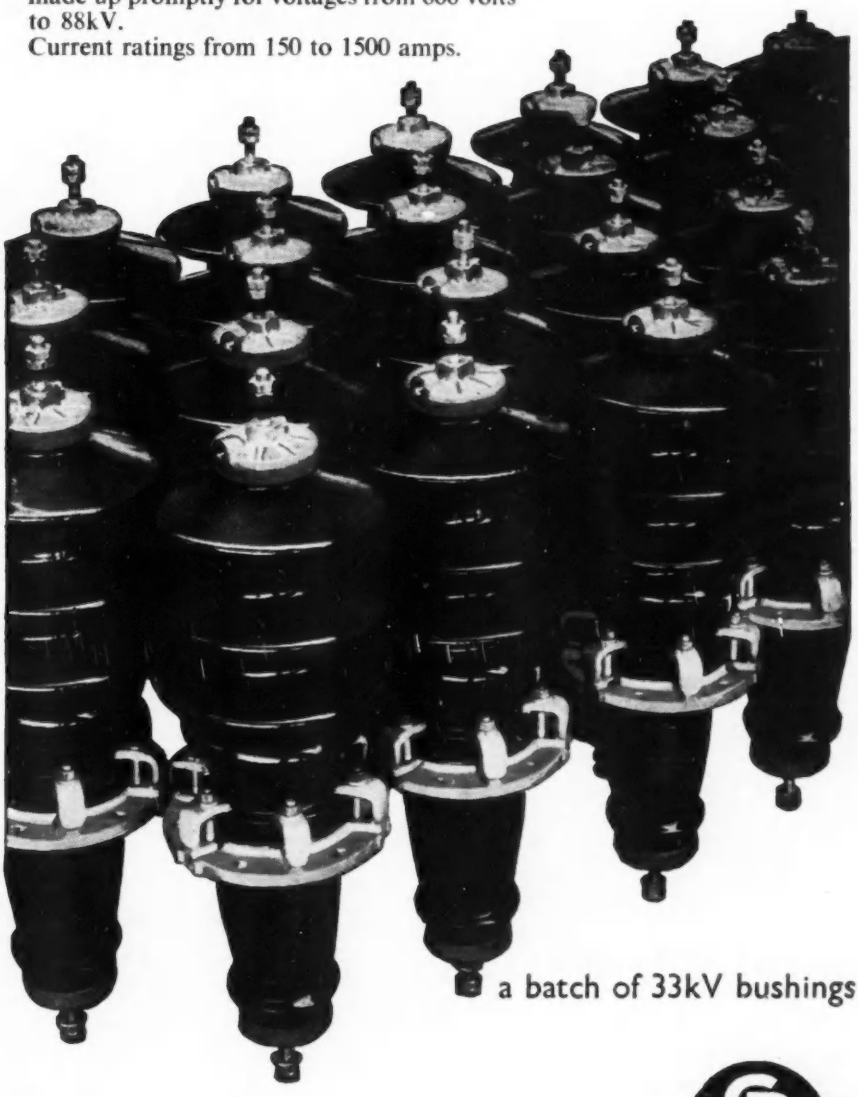

a batch of 33kV bushings

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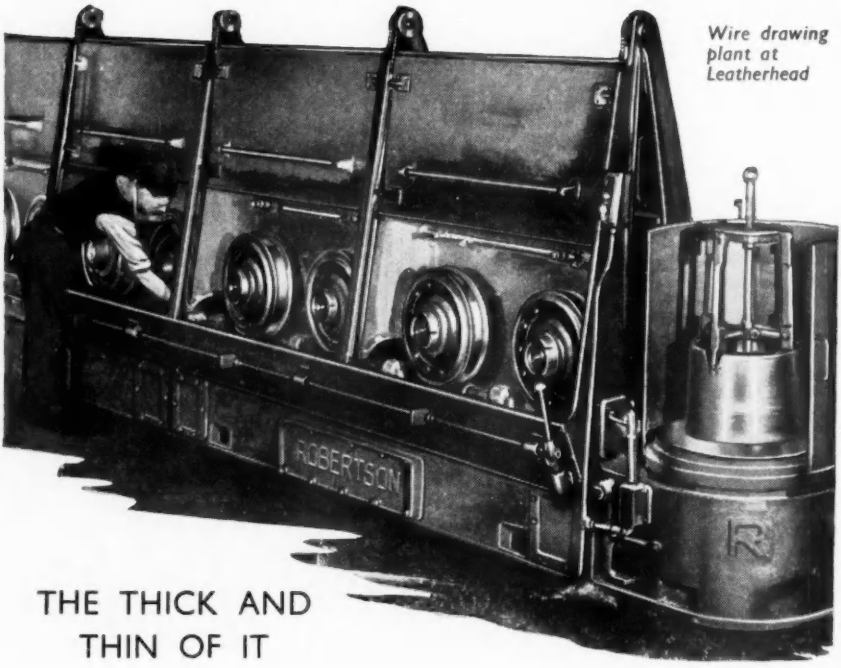

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Heavy-duty armoured giants or lissome V.I.R. Cable — there is a General Cable for every ordinary purpose. And when something unusual is needed, then we make a special cable to fulfil the requirements. One thing however *is* constant, and that is the high quality. *All* General Cables are as good as modern machinery, tended by conscientious craftsmen, can make them.

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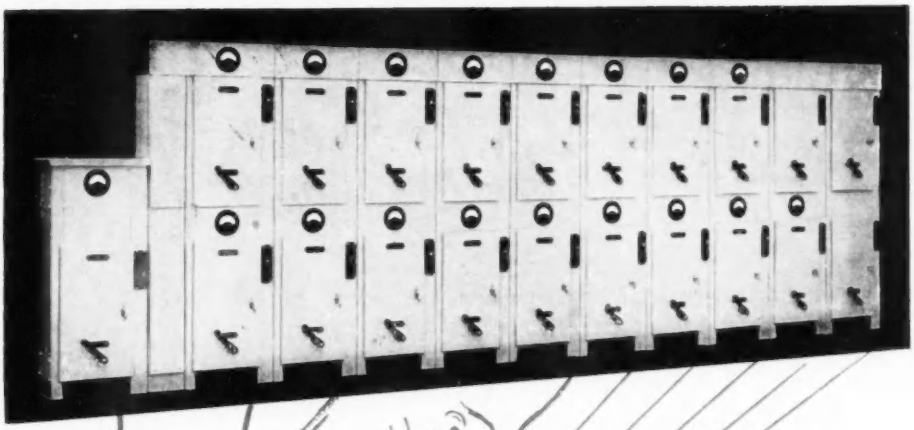

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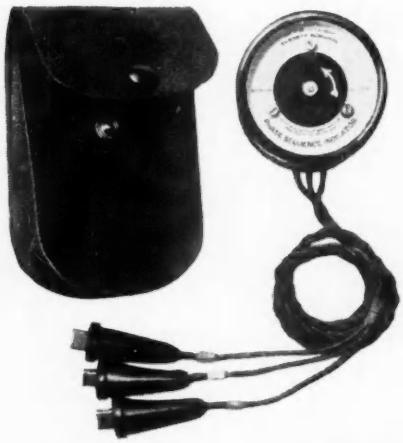

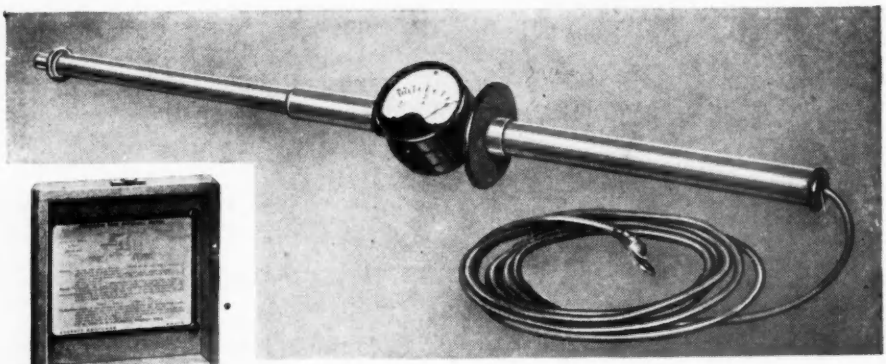

(Top) Phase Sequence Indicator
(Centre) Live Line Tester
(Left) Precision Time Interval Meter

EVERETT EDGCUMBE

Makers of electrical instruments for indicating, recording and controlling; photometric apparatus; process controls.

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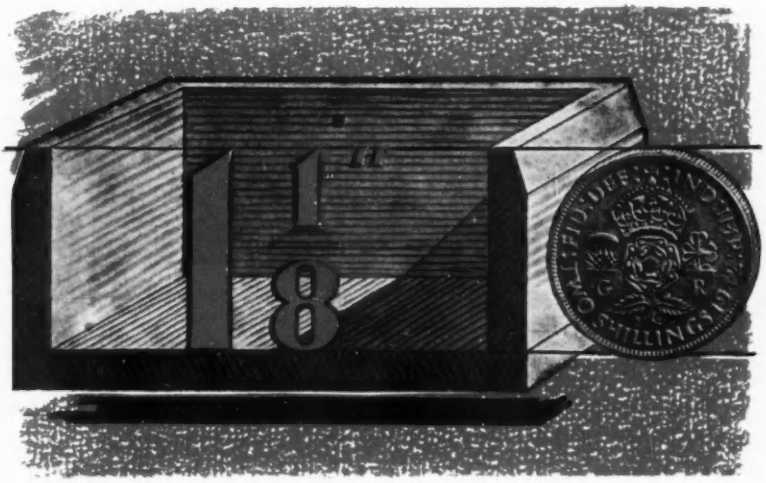

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Micro Ammeters of extreme sensitivity

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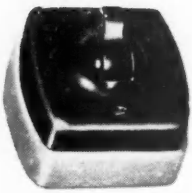
TUMBLER SWITCH

JUST  ONE

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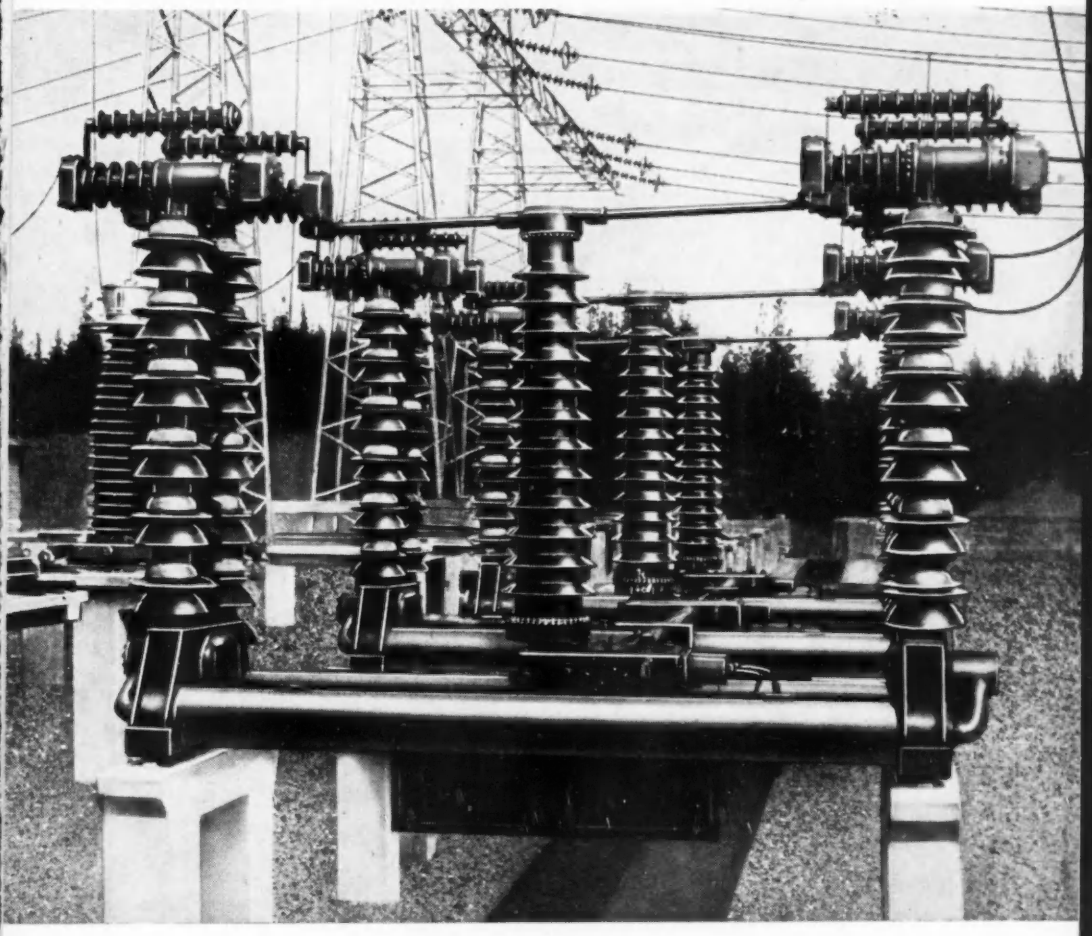
The First Contract-Built
220kV Air-Blast Circuit-Breakers



completed for Finland by METROVICK

The first British-built 220kV circuit-breakers for commercial service have now been installed in Finland by Metrovick. These circuit-breakers clear a fault within 0.07 seconds of trip impulse and are designed to reclose automatically after a "dead time" adjustable between 0.25 and 0.4 seconds.

The experience gained from the manufacture and installation of these equipments has been applied to the design of circuit-breakers for 275kV and higher voltage transmission systems.

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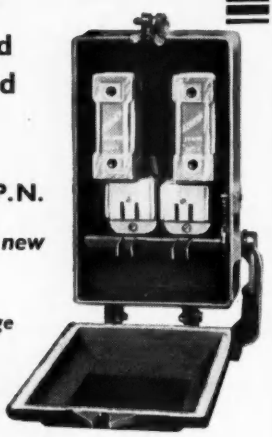

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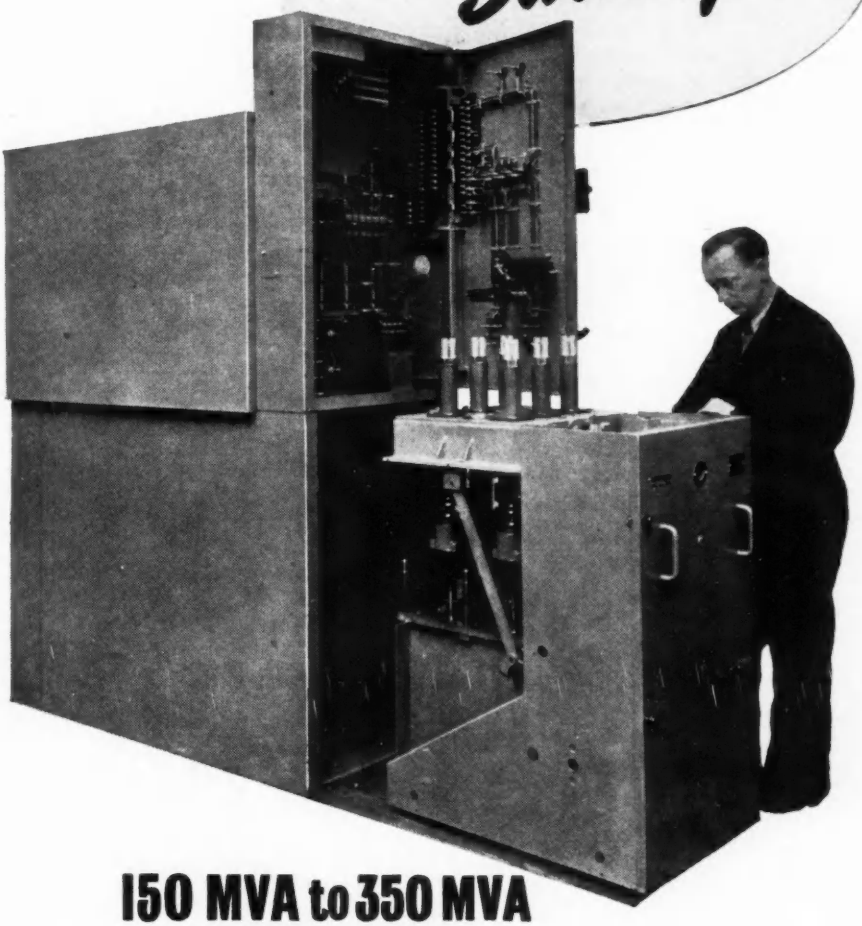

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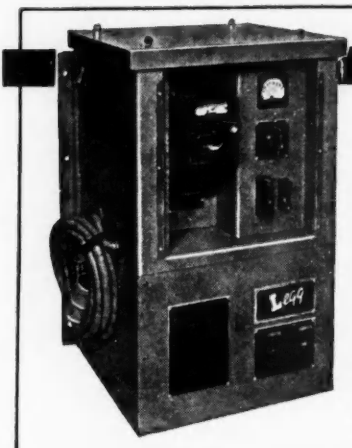

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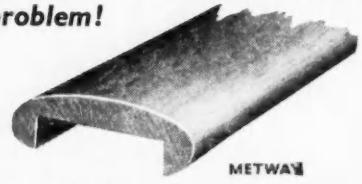

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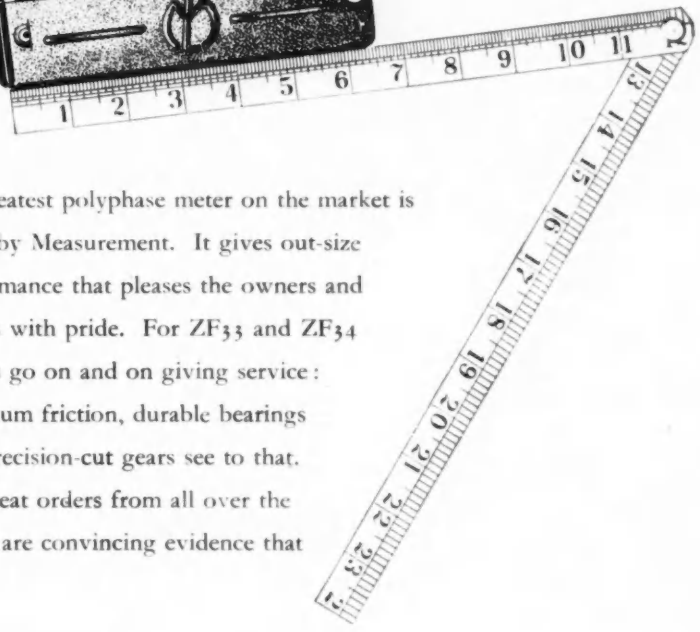

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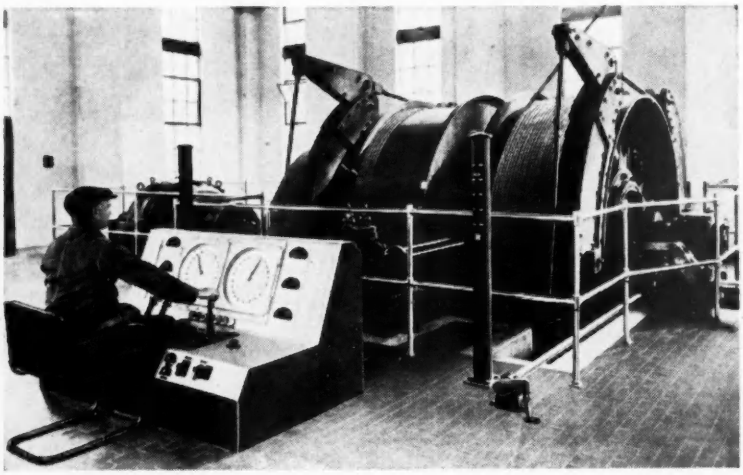

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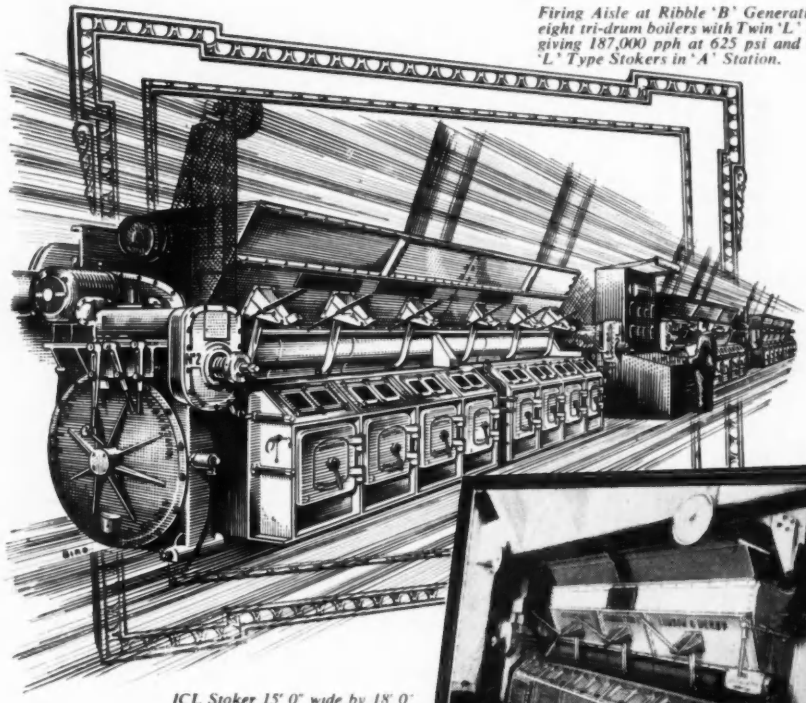

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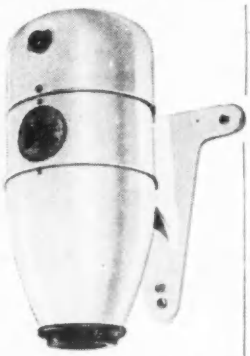

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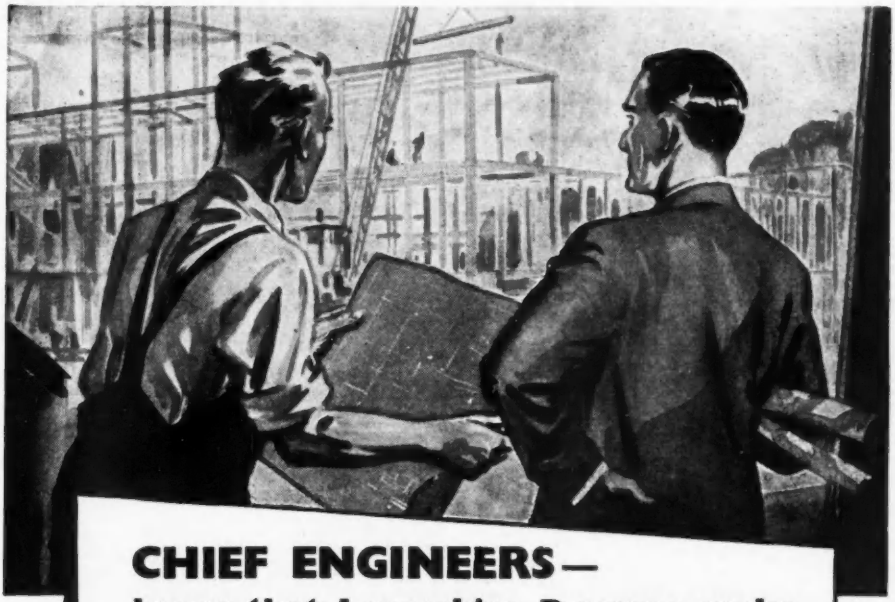

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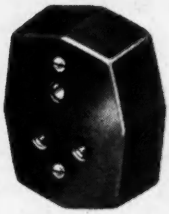

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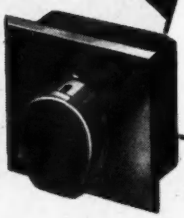

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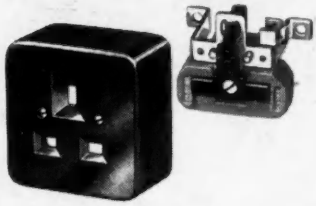
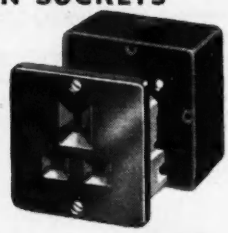


A3004 SURFACE



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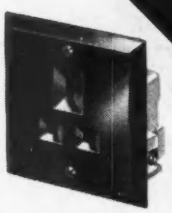

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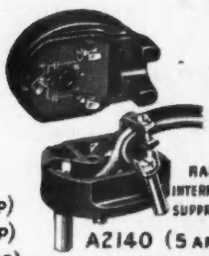

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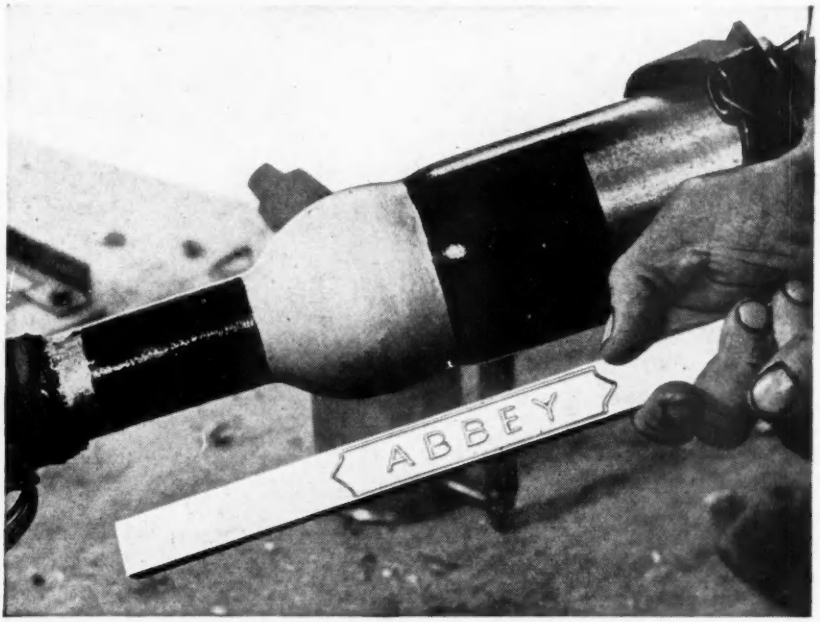

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A finished joint between the gland of an isolator and an 0.25 sq. in. II KV cable.

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ELECTRICAL TIMES

Vol. 121 No. 3160 THURSDAY, 29 MAY 1952

PUBLISHED EVERY THURSDAY

SIXTY-FIRST YEAR OF PUBLICATION

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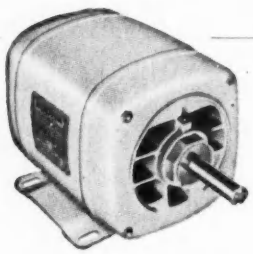

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Editorial

STAND-BY DUTIES

THE supply industry and its staff were built up around the tradition of continuity of supply. If a breakdown occurred, no effort was spared to restore supply at the earliest possible moment. To this end systems were evolved, over the years, varying in detail from town to town, but usually arranging a rota for certain staff to be on call at their own homes should trouble arise. However, in 1948 the N.J.I.C. gave a ruling that no extra payment is to be made for stand-by duties at home, and in consequence such systems that had worked reasonably well over many years became no longer possible. The suggested alternative of a few hours' stand-by at headquarters on overtime rates cannot meet the requirements of what should be a 24-hour service. Certain alternatives have been put to the N.J.I.C., but these foundered on the earlier ruling. In consequence the present position is hardly satisfactory. While in some districts a compromise has been reached with the manual workers, in others there is no stand-by at all. To the senior staff, schooled in the old tradition of service to consumers, this state of affairs is alarming. Such conditions make it difficult to avoid the question, whether the N.J.I.C. were fully aware of all the operating factors when they reached their original decision. Are they satisfied now that the present conditions arising from the implementation of their ruling meets the requirements of a nationalised service? If not, it would be better that they had second thoughts on this difficult subject.

A JUSTIFIED SCHEME

SELDOM has there been a more enthusiastic audience in the I.E.E. lecture theatre than that gathered together last Wednesday to listen to the paper on the proposed 275 kV grid system. As pointed out, time and again in the subsequent discussion, from all points, technically and economically, the scheme was fully justified. Further, the stimulus given to British manufacturers in the development of high-voltage equipment for the system will have the most important repercussions in the export market. There is often a tendency to forget the vast unexploited natural resources of the Dominions and the large distances involved in electrification schemes abroad. In these vast areas, voltages of 250 kV upward are the only really economic solution to the problem of power transmission. The establishment of 275 kV grid in this country will therefore provide, in addition to its primary function as a power transmission network, a proving ground for British produced equipment, which in turn will lead to increasing confidence on the part of the overseas purchaser of extra-high voltage equipment.

HALFWAY HOUSE

THE arguments leading up to the establishment of 275 kV as the standard voltage to be adopted were not perhaps as well defined as might have been expected. Admittedly 275 kV working with 300 kV maximum is one of the standard voltages proposed by the International Electrotechnical Commission, but the provision made on certain sections of the system for a possible future step up to 380 kV shows that the selection of 275 kV must have been based on present-day technical considerations as well as economic ones. It was, however, emphasised that the economics of conventional long-distance transmission could not be applied to a system with the dual function of interconnection and bulk transmission of power. A further point in connection with the voltage selection is the atmospheric pollution on insulators common in this country, as compared with the almost dirt-free atmosphere through which many of the Swedish and American high-voltage lines run. This makes a conventional cap

and pin string for 380 kV operation unduly long, and the tower design in turn becomes difficult and expensive. The answer to the problem, which the authors confidently expect will be available in the next few years, lies in the development of stabilised rod insulators. With these, the existing 275 kV insulator lengths will prove ample for 380 kV working.

HUSTLE IN WIRING

BY inviting a mechanical engineer to deliver their annual lecture, the I.E.E. Utilisation Section ensured that they should be left with plenty of provocative ideas to consider. Indeed, so packed with personal opinion was MR. CARTWRIGHT's talk, that the prohibition on discussion which is traditional at this meeting seemed for once an undesirable provision. He distinguished a wide range of problems as demanding urgent attention, but one in particular stood out, because its importance extends far beyond the steelworks with which he was concerned. How can the terminating of cable runs be speeded? This is always a comparatively lengthy operation and even though the hour or so per termination quoted by the lecturer will not always apply, it lends point to his plea for mechanisation of this job. Many difficulties immediately come to mind, and also many good reasons for present methods. Why do we not mechanise the making of connections on large installations; or, do we perhaps feel that the extent to which mechanisation is already carried is the practical limit? One eminent engineer would evidently like to know.

TRUTH TOO LATE?

THE campaign for recognition of the place of electricity as a medium for heating in the home continues to gather momentum and in the space of only five weeks much has been achieved. It was SIR JOHN HACKING'S speech at the Institute of Fuel that opened the counter-attack and at that time Meteor suggested that a new phase in the supply industry's propaganda might be heralded. This has proved to be the case, and since then there has been no challenge that has not met with its answer. In the correspondence columns of our dailies it is refreshing to find electricity once more adequately represented. Results have been rapid. Already the more serious weekly reviews are drawing attention to this apparent change of policy and one has gone so far as to publish an article in two parts under the inspiring title of "Electricity hits Back." The public are at last becoming better informed; they are learning that no longer is it a crime against the nation's interest to use an electric fire. All this is admirable; our only hope is that it is not too late. Rumour has it that the Ridley Committee are putting the finishing touches to their report. This was prepared in a climate favourable to solid fuel, with much of the evidence submitted from bodies having no special technical knowledge, but nearly all favouring solid fuel. The case for electricity will rest on the adequate sifting of the technical factors from the general mass of evidence, and the extent to which the committee listens to the all-too-few advocates of electricity's case.

WHAT CAPACITY?

AMERICAN and English is the same language—approximately. A fresh reminder of this insidious difficulty comes with an A.S.T.A. publication on circuit-breaker ratings. An Atlantic crossing subtly modifies the meaning of "500 MVA breaking capacity," and the American genius for overstating a case—or is it British reserve?—makes this mean less in terms of performance in the United States than over here. While pleasant enough as an example of national traits, and as a pointer to the pattern of technical development in the two countries, such a difference becomes a serious problem when commercial considerations come into question. For the same description on the label, the British product must seem poorer value for money, when in fact the opposite comparison is true. The answer as suggested in the present document seems to lie in a special rating for the North American market, which will take all such factors into account.

Meteor

Concenter Power Station Genoa

Two additional 50 MW steam units put into operation to compensate for decreasing hydro-electric resources

By Antonio Giordano

THE large steam power station at Genoa, inaugurated in 1929 by the "Consorzio Centrali Termiche" (Concenter), was originally established to meet seasonal deficits in local water power. Up to the war, the installed capacity of 50 MW, consisting of two 25 MW turbo-alternator sets, proved sufficient for the task. After the war, however, the increase in load in the area, coupled with the fact that the greater part of the available water power was already exploited, made it essential that the thermal power should be considerably augmented. This addition was also required as part of a national scheme which required the construction of other plants, at Piacenza Tavazzano, Turin, and Civitavecchia.

The new plant, which has recently gone into operation, consists of two new turbo-alternators with a nominal output of 50 MW (m.c.r. 62·5 MW) and each set having two new boilers, each with an output of 325 klb/hr at 900 lb/sq in. superheated to 900° F.

Fortunately, in anticipation of increased requirements, the original station had been designed for an ultimate capacity of 200 MW, so that the installation of the new plant has not needed any major civil engineering works. In fact the only additional requirement has been a new concrete building to house auxiliary services and the administrative staff. This three-storied edifice has been built parallel to the west side of the old building and has stores

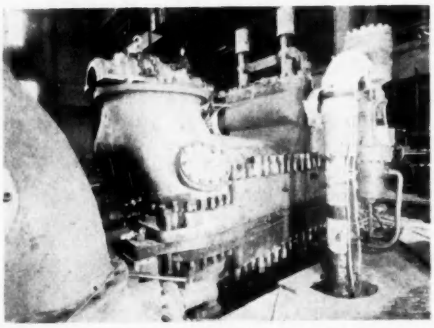
This view of the machine hall shows the two original 25 MW sets in the foreground with the newer units in the distance. An unusual feature is the two sets of crane rails placed one above the other

on the first floor, repair shops and garage accommodation on the ground floor, while the upper floors are devoted to offices.

The fuel storage and handling plant on the east side of the site remains virtually unaltered. As far as the coal is concerned, the only additions have been the provision of a Redler type coal distributor and conveyor, and, as the station may on occasion run on liquid fuel, two oil tanks, each with a capacity of about 11,500 cu ft, have been provided. The coal storage capacity is about 25,000 tons.

Boiler Plant

The new steam generators have been built by Combustion Engineering Superheater Incorporated, and can burn both pulverised coal and fuel oil. The combustion chamber is of the radiant type with tangential burners. Hot gases pass through the vertical superheater, which is divided into two sections, a range of steam pipes, a horizontal type economiser, air preheating equipment of the Ljungstrom type, the cyclonic-type mechanical grit extractor and the induced draught fans, transferring to the chimney at an exhaust temperature varying between 150 and 170° C. Combustion air is conveyed by the aid of a forced draught fan to the preheater, and then to the burners. Each steam generator is provided with Raymond-type mills with variable speed coal feeders. The burners are placed at the four corners of the combustion chamber and include three units for pulverised coal firing and two for the fuel oil firing. Fuel oil burning plant includes the feed pumps, steam heating plant, and purifying and filtering equipment.



Above is the h.p. cylinder during erection. Note that one of the bearing keeps is resting on the exhaust flange

Generating Sets

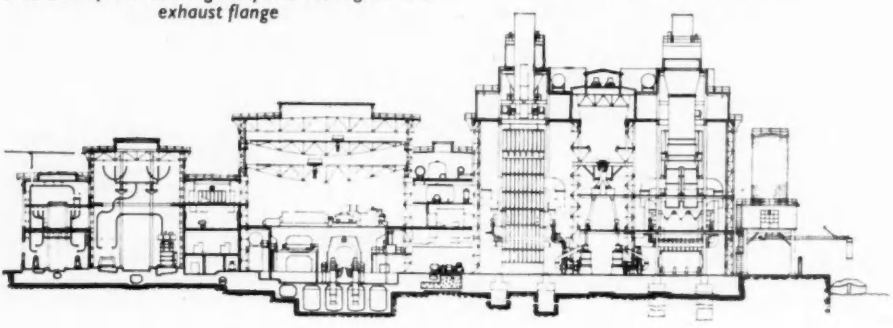
The generating sets consist of direct coupled turbo-alternators built by Westinghouse Electric International Co. The turbines are of the mixed reaction and impulse type with two sections. Steam is admitted through five inlet valves. The nominal power is 50 MW and the maximum continuous rating 62·5 MW. Governing of the turbine is by a hydraulic oil system of the relay type acting on the inlet valves. The generators, with hydrogen cooling, have a maximum power of 78 MVA at a voltage of 13·8 kV and normal p.f. of 0·8. The generators are oil sealed to prevent hydrogen leakage, with oil purification through an appropriate system. Direct-driven excitation is employed with main and pilot exciters. The voltage regulation system is of the well-known Brown Boveri type.

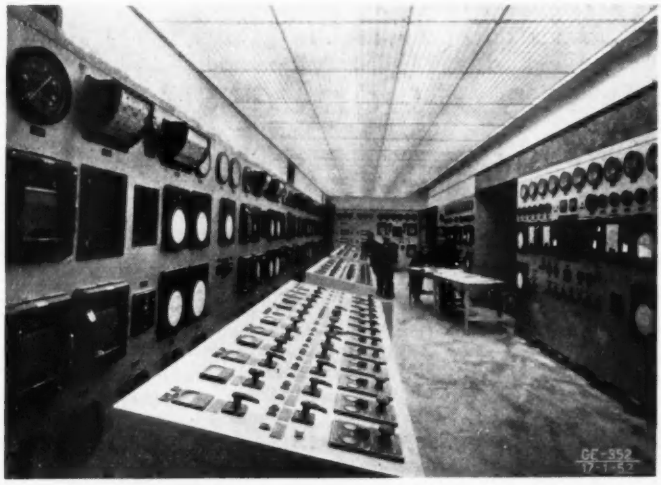
Each condenser is of the cross-flow type and is separated in two halves by a diaphragm fitted with a valve to allow of parallel operation. Two vertical pumps handle the circulating water and air extraction is undertaken by two ejectors. Level of the condensate in the hot well is automatically regulated.

From each condenser the condensate is handled by two double section vertical pumps, one of which acts as standby.

Regulation of the temperature of the superheated steam is carried out by an electric system using Leeds and Northrup equipment.

Below is shown a cross-sectional view of the station arrangement





The centralised control room is shown in this illustration. It can be seen that the actual instrumentation is most comprehensive and includes the American practice of using television technique for examining the flame conditions at the burners in the furnaces

Bailey Meter Co. instruments are provided for other control and recording functions.

Combustion is automatically regulated in such a way as to maintain the constant pressure of the steam at the stop valve of the turbine, and to keep the air and fuel feeding in the proportions required by an efficient combustion.

Electrical Details

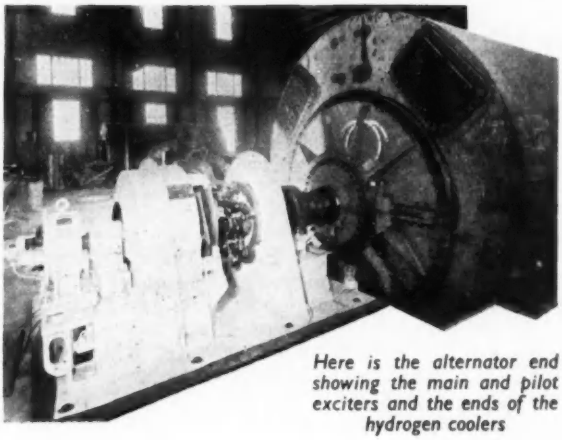
The electric switchboard of the station is operated both by hand or automatically as required. Power for the automatic control gear is direct current and a converting station and an accumulator set are installed to ensure continuity of supply for the station services.

The generators are directly coupled to transformers by means of strengthened busbars. A voltage step-up from 13·8 kV to 130 kV is obtained through oil-cooled transformers of 75 MVA, from which the power is conveyed to the main distribution system. The motors of the larger auxiliary units are operated at 3,000 V and those of smaller units at a voltage of 380 V. All the circuit-breakers are of the air break type and are located in a single room.

All the instruments, remote control equipment and other auxiliary control gear have been concentrated in the special control and operations room situated near the main turbine hall.

In connection with the other steam electric centres under construction in Italy, it is worthwhile mentioning that the Tavazzano plant, which will have the same capacity as Genoa, is to have its boilers provided with coal-, oil- and gas-burning devices. Normally, however, only methane is to be used by this plant.

On the other hand, through the employment of rotary drilling machinery the Societa Lardarello (the capital of which is in the hands of the Italian State Railways Administration) has discovered in the province of Pisa two new natural steam wells, one with an output capacity of 6,600,000 lbs./hr and one of 6,300,000 lbs./hr at a pressure of 105 lb/sq. in. With the exploitation of such wells the Lardarello Co. has started the construction of a new natural steam electric centre, where will be installed a plant with a capacity of 50,000 kW. This should be placed in service in 1954.



Here is the alternator end showing the main and pilot exciters and the ends of the hydrogen coolers

The ROYAL SOCIETY *Conversazione*

INVESTIGATING NATURE'S SECRETS WITH NEW INSTRUMENTS

THE Royal Society holds, once a year, a conversazione at which some of the more interesting scientific discoveries, particularly in the biological field, are shown to members and to various interested parties. Among the exhibits, which are necessarily restricted in numbers due to space considerations, are usually several dealing with electrical phenomena. These are mostly in the form of new research equipment often developed to investigate specific research lines, but in many cases of wide general application.

Infra-Red Measurement

Thus the Telecommunications Research Establishment, last Thursday and Friday, were demonstrating an infra-red high-speed spectrometer. In the past, the problem of infra-red measurement was complicated by the fact that the time response of the infra-red detector was long. However, photoconductive detectors such as lead sulphide, selenide or telluride cells have been developed over the past few years with a remarkably high speed response.

In the equipment being shown, infra-red emission and absorption spectra are presented on a cathode-ray tube with a repetition rate of 100 cycles/second. Part of the prismatic spectrum of a hot source of radiation is rapidly oscillated across the exit slit of the instrument and focused on the detector, the varying response of which is amplified and presented on a cathode ray tube with a time base running in synchronism with the oscillating device. The absorption spectra of samples of various materials placed in the radiation beam may thus be viewed directly. The instrument was primarily devised for the identification of short-lived substances by their spectra.

Counting Particles

A technique developed for resolving closely adjacent particles has been devised at University College, London. This consists of a mixture of optical and electronic amplification. Light taken from a scanning raster of a c.r.t. is used to illuminate the cell containing the particles and an optical microscope enlarges the image. As at any time, only a spot of light is being used, a photo-electron multiplier tube is used to convert the output signal into electrical impulses which are then amplified and again converted into light on the end of a large c.r.t. If a count is needed, an electronic counter can be included in the circuit to give a direct count. The virtues of this system lie in its greater contrast, and greater resolution of low contrast materials, and, of course, in its ability to size and sort microscopic particles.

In the high-frequency field, an unusual exhibit, also from University College, London, was the transmission of high-frequency power (10,000 Mc/s) along a bare or dielectric-coated circular wire. The whole of the power flow is concentrated in a radius of a few centimetres round the wire, and the arrangement can carry hundreds of kW if necessary.

Materials Research

The General Electric Co.'s Research Laboratory had two exhibits, one showing a remarkable property of germanium. When a molten globule cools on a refractory base, it will suddenly change into a conical form. This was demonstrated by a film in which the process was clearly seen. The phenomenon is mainly due to the absence in germanium metal of suitable nuclei to initiate crystallisation.

The other exhibit demonstrated the synthetic production of sapphires in the form of a rod, a shape most suitable for the manufacture of jewels for watches and instruments. Here an unusual phenomenon was the gradual tilt of the optical axis as the rods became long, leading to a non-circular cross section, combined with serrations.

A miniature radio link by Standard Telephones and Cables using transistors and working between 1 and 2 Mc/s carrier frequency demonstrated the remarkable development that has taken place in these non-thermionic valves.

Of interest to biologists was an X-ray tube having a magnetic lens which focuses the electron beam into a focal spot of less than 0·001 mm. dia. This can be used to obtain photographic images of near objects on a distant plate, as it is virtually a point source. The resolution so far obtained approaches that of the optical microscope, and it is, of course, possible to see the internal details of the object.

THE 275 kV GRID

Britain's e.ht. network and its implications presented at I.E.E.

FROM time to time various aspects of the 275 kV Grid system, now under construction in this country, have been described. In August, 1949, for example, we gave some details of the projected Newark-Sheffield line; in March, 1950, an account was presented of the research work being carried out at the B.E.A. research laboratories to establish the most effective conductor design, and in October of last year we reported Sir John Hacking's chairman's address to the Institution of Electrical Engineers, in which he explained the reasons for establishing the 275 kV system.

A comprehensive paper covering the whole scheme both economically and technically has now been written, and was presented to a Supply Section meeting of the I.E.E. last Wednesday by Mr. D. P. SAYERS, Dr. J. S. FORREST and Mr. F. J. LANE.

Much of the paper was naturally devoted to the considerations leading up to the project. The first objective was to build up a picture of the probable position in this country some 10 to 20 years ahead. In estimating the load, two methods were used. First, each Area Board submitted maps showing, by means of spots each representing 10 MW, the estimated amount and distribution of the load in its area in 1955, 1960 and 1965. The aggregate of these loads was estimated as about 30,000 MW by 1965. Second, the Authority's staff prepared estimates based on sales analysis of the load for each Area Board at five-yearly intervals from 1955 to 1975. These indicated that the demand of 30,000 MW would not be reached until 1975. For the purposes of computation, however, the mean of the two estimates was accepted.

Interconnection

Study of the out-of-balance experienced in the past showed that without additional interconnection, the existing system would have to be operated in not less than three separate groups. To provide the necessary marginal plant in these groups, an additional $3 \times 3{\cdot}6\%$ of the existing plant would be required. Thus national interconnection held an overwhelming advantage from an economic viewpoint.

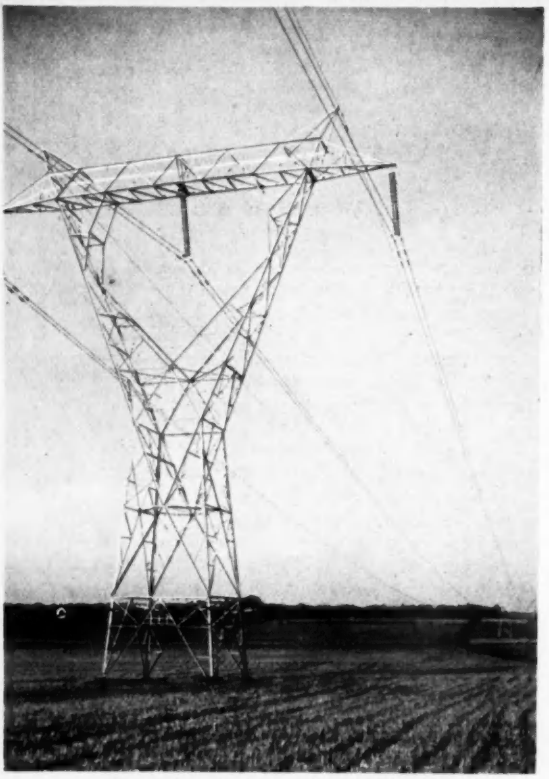
A further point was that while much of the future coal would be produced in the East Midland, Yorkshire and North-Eastern zones, a large proportion of the energy required would be consumed in London and the southern counties, Manchester and Merseyside.

Initially the voltage was taken arbitrarily as twice the existing 132 kV standard, although large capacity 132 kV lines were also investigated. In the latter case, the number of circuits, however, would prove unduly large and wayleave and operational difficulties would arise. Finally, economic studies showed that 275 kV nominal 300 kV maximum was most satisfactory. This voltage also complied with the standards proposed by the International Electrotechnical Commission.

In order, however, to legislate for possible future requirements, it was decided to construct the lines so that they could be operated on a nominal voltage of 380 kV.

Bearing in mind the arguments above, it was decided to erect a 275 kV grid as shown in the map, and to site, as far as possible, future generating stations in the coal-producing areas. The scheme, to meet requirements up to 1960, was estimated to cost about £52 million, and Stage 1, scheduled for completion in 1955, should cost about £20 million.

Map of 275 kV grid. Full lines in operation by 1955, dotted by 1960



Design for experimental length of line (Staythorpe—Sheffield)

An experimental section of 264 kV line has been erected between Staythorpe and Sheffield and a test section for research work was erected at Leatherhead in 1949. This latter section has been operated since that date in order to obtain data on interference, power loss, and insulator leakage current. The losses vary greatly with weather conditions. Using twin 0·175 sq in. conductors, in fine weather the loss is as low as 2 kW per 3-phase-mile at 280 kV rising to 60 kW per 3-phase-mile under conditions of snow. The mean loss however stands at about 3·5 kW per 3-phase mile.

Equipment Design

An important controlling factor in the scheme design was the short-circuit level and after full consideration it was decided to adopt short-circuit limits of 7,500 MVA at 275 kV and 3,500 MVA at 132 kV, at the main points of interconnection. All transformer neutrals would be solidly earthed as in the 132 kV system. An impulse level of 1,050 kV would therefore prove adequate.

The double-circuits would use either twin 0·175 sq in. conductors at 12 in. spacing or twin 0·4 sq in. conductors also at 12 in. spacing. The thermal ratings for a temperature rise of 30° on an ambient of 20° C for these conductors were: twin 0·175 sq in.—800 amp., 375 MVA; twin 0·4 sq in.—1,200 amp., 570 MVA. The twin 0·175 sq in. lines would be employed when the function was primarily that of interconnection, whereas the line having 0·4 sq in. conductors would be involved in bulk transmission as well as in interconnection. In the event of the voltage being established at 380 kV, the twin 0·4 sq in. conductors would be acceptable.

Transformers and Switchgear

Three types of transformer would be needed, 120 MVA, 180 MVA and 240 MVA. Transport difficulties would probably limit the majority to 120 MVA, but where possible the larger sizes would be used. As these transformers were 275/132 kV units, they would be auto-transformers and on-load tap-changing would be needed.

The 275 kV switchgear would be rated at 7,500 MVA, but this rating might have to be increased to 10,000 MVA. The thermal ratings would be 800 and 1,200 amps to conform to the appropriate line ratings. Provision would be needed for application of high-speed 3-phase auto-reclosing with a circuit severity of 4,000 V/microsec at 100% short-circuit rating and 10,000 V/microsec at 30% rating. It was also proposed that the generated over-voltages should be limited to a maximum of 700 kV.

Four C.T.'s would be required on each phase of each circuit, two for busbar protection, one for circuit protection and one for local and remote instrumentation. All C.T.'s would have a nominal ratio of 600:1.

In the substations, the structures would be of reinforced concrete and busbars would be of copper-clad steel tube with a current rating of 1,200 amps. The substations, as at present laid out, made no provision for 380 kV working, but wherever possible space would be left to permit the erection of 380 kV gear in the near future.

DISCUSSION

MR. T. G. N. HALDANE (Merz and McLellan), who opened the discussion, said that the 275 kV development in this country and the provision for the future of 380 kV development would stimulate British export trade in the high voltage field. The authors had made out an overwhelming case for the super-grid even at their conservative estimate of 5% saving on spare plant. It seemed likely that the 275 kV lines would be brought to full load as soon as they were available, and the step upwards to 380 kV might come earlier than the ten years mentioned by the authors.

DR. S. WHITEHEAD (E.R.A.) said that current

measurement was a difficulty because the current transformer was so elegant that its insulation was costly. Alternative methods must be sought in which different principles could be used. The majority of interference came from overhead lines below 11 kV. Concern about radio interference abroad was no doubt due to the lower television and broadcasting field strengths. Carrier transmission would have to be treated carefully, and the high voltage line was a good radiator of anything generated by the consumer.

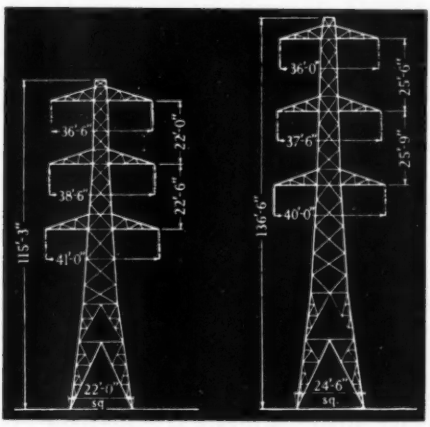
MR. J. D. PEATTIE (B.E.A.) said that the authors' conclusion that there would be a saving of at least 5% for the same service in generating capacity was fully justified. In 1960, 32 million additional tons of coal would be required as compared with 1939. The bulk of it would come from the middle of the country, particularly the east Midlands. The 275 kV Grid would help to solve the problem of moving energy from the more prolific coalfields in the Midlands to the load centres round London and Manchester with the maximum possible economy.

MR. J. CHRISTIE (A. Reyrolle and Co., Ltd.) said that the manufacturers of switchgear were increasing their testing station facilities. Breakers going into the scheme would therefore be proved to a degree not previously possible.

MR. R. J. COCHRAN (Metropolitan-Vickers Electrical Co., Ltd.) said that transport was the major problem of the transformer engineer. At the moment there was a limitation of 150 tons gross weight, beyond which a dispensation had to be obtained from the Ministry of Transport for every foot of the route.

MR. G. F. KENNEDY (Kennedy and Donkin) stressed the importance of the 275 kV Grid in saving coal.

MR. C. C. BARNES (B.E.A.) said that the major factor against the use of insulated cable was its high price. Economy in electric cable could be obtained by reducing the selling price and/or by increasing the permissible rating. Both possibilities offered scope for detailed investigation. Five different cable systems for 275 kV service could hardly be justified economically if they were to be adequately manufactured and tested.



Towers for 275 kV; left for twin 0·175 sq in., and right for twin 0·4 sq in. (later operation at 380 kV)

MR. C. F. HUMPHREYS (B.T.H.) said that his company had chosen the bulk-oil breaker and the first problem was to minimise what was probably its only disadvantage—the quantity of oil to be handled under maintenance. This had been done by means of a so-called rectangular design. Four separate arc control devices shunted with a wire-wound resistance were used in their design. The authors had suggested copper-clad steel for the spans on the 275 kV substations but unfortunately this was in very short supply and extremely difficult to obtain. Consideration had therefore been given to the use of ordinary hard-drawn copper tubes.

MR. F. C. WALMSLEY (Micanite and Insulators Co., Ltd.) said that interchangeability of 132- and 275-kV terminal bushings had presented quite a problem. Two styles had received consideration—the conventional form and the re-entrant form. A measure of interchangeability centering round the latter had been achieved.

MR. P. H. MARGEN (Kennedy and Donkin) considered that the initial value of the 275-kV Grid would be to provide the kW required in the present emergency period, while its main value in the future would be as a means of bulk supply. Thus the nature of the network would to a certain extent change.

MR. J. A. PRESCOTT (English Electric Co., Ltd.) said that it would be interesting to have a cost comparison between two 0·175 in.^{2} and single 0·45 in.^{2} conductors, bearing in mind the increased loss in the former as a consequence of the higher resistance. He agreed that the omission of the by-pass isolator in the switchgear simplified the layout.

MR. W. H. THOMPSON (Metropolitan-Vickers) said that the B.E.A. supply was very complex and probably represented the greatest concentration of electrical power anywhere in the world. The advent of the 275-kV Grid was bound to increase the complexity and add to the problems, one of the greatest of which would no doubt be the stability of the system.

SIR JOHN HACKING (B.E.A.) (President of the Institution) felt sure that the super-grid was a right solution, but in these days of planning justification was half the battle and the justification of schemes which were obviously correct was a very difficult matter. This scheme would cost tens of millions of pounds and every effort had been made to simplify the arrangements and reduce the total cost. He felt sure the electricity supply industry would continue to grow at much the same rate as during the past 20 years.

Dr. Forrest and Mr. Lane briefly replied.

Notes on Wiring
by MEGOHM

FUN OF THE FAIR

Birmingham in Retrospect

LOOKING around the B.I.F. at Birmingham little was to be seen in connection with new installation developments and the general impression one gathered from manufacturers' representatives was a lack of interested buyers. I, however, spent an enjoyable day there and found much to attract my attention that was of interest to installation engineers.

The development of mineral insulated metal sheathed heating cables capable of continuous operation at temperatures up to 250° C should open up new fields for the development and use of such cables. The cables are available in lengths of 300 to 800 yards, the lengths being determined by the cross section of the conductors to be used. The cables are suitable for background heating in homes, offices and workshops, etc., and may be laid direct in concrete floors at an approximate depth of 2 in. If the cables are laid at 6 in. centres with a loading of 15 watts per square foot it is estimated that this will provide a floor temperature between 65°-70° F. These cables may also be used for constructing local heating panels by attaching the cables to m.s. sheets with an interposing layer of heat insulation.

Cables in Concrete

An alternative method which was on display shows cables embedded in a concrete and plaster panel which throws out a very good heat but it should be remembered when using this method the maximum surface temperature must not exceed 140° F so as to ensure that cracking and discolouration of the plaster does not occur. The cables are suitable also for de-icing and for heating liquids which do not corrode the cable sheath. An important point to remember when installing heating cables is that due to the high operating temperature the sealing of the cable ends must be carried out with high temperature glazed seals.

With reference to cold seals which are now generally used on m.i.m.s. cables on lighting and power installation work, the manufacturers have issued a useful instruction booklet which clearly illustrates the best method for installing and sealing cable ends on m.i.m.s. cables.

A large variety of local switches and sockets were on display and the general trend seems to be a reduction in the overall dimensions of these accessories. This has been made possible due to the introduction of the microgap switch which now permits not only a one gang switch and a 13 amp flat pin fused plug and switch socket but also a 2 gang 5 amp switch unit to be housed in a standard B.S.1299 conduit box whose dimensions are of the order of $2\frac{3}{4}$ in. x $2\frac{3}{4}$ in. x $1\frac{3}{8}$ in. depth.

Distribution Board

One manufacturer has introduced a really clean line distribution board for installation in residential and office premises. The cover of the distribution board is fitted with a flush press button catch and a sorbo rubber gasket to ensure a dust tight enclosure. The hinges are spring loaded so that the cover must either take up a fully opened or closed position. The only criticism I have to make is, will the springs in time give trouble, and further I understand that the cost of this type of board is higher than standard equipment. I am at a loss to understand why manufacturers cannot produce a clean line distribution board for the same or even at a lower cost than some of the boards now on the market with their crevices for collecting dirt and protruding nuts and bolts, etc., without increasing costs.

I am told further consideration is being given to the use of polythene insulated and p.v.c. sheathed cables by the I.E.E. Wiring Regulations Committee. I was, therefore, interested to see arranged on a display board a polythene insulated and p.v.c. sheathed cable comprising 2-core 7/·029 flat twin and earth supplying a miniature ring circuit. My attention was focused on a series of dots at 9 in. intervals in the cable sheath and on enquiry was advised by the manufacturers' representative that these dots were heads of steel pins which had been driven through the centre of the flat sheathed cable fixing the cable to the display board. We both agreed that this was really a very bad way to demonstrate the installation of this type of cable to visitors to the exhibition.

The Art of Illumination

Wide diversity of Lighting Applications covered in the Papers at the Summer Meeting at Eastbourne of the Illuminating Engineering Society

LAST week the Illuminating Engineering Society held its Summer Meeting at which several papers of particular interest were presented. Following the official opening on Wednesday, carried out by the Mayor of Eastbourne, Dr. W. S. Stiles of the National Physical Laboratory gave the first paper entitled "The Eye, Brightness and Illuminating Engineering." This dealt with the fundamentals of vision and visual perception, and began by analysing the process of "seeing" from a physiological angle. From this, the effects of "brightness" were investigated and the remarkable difficulty of obtaining accurate and consistent experimental results was emphasised.

Physiology of Seeing

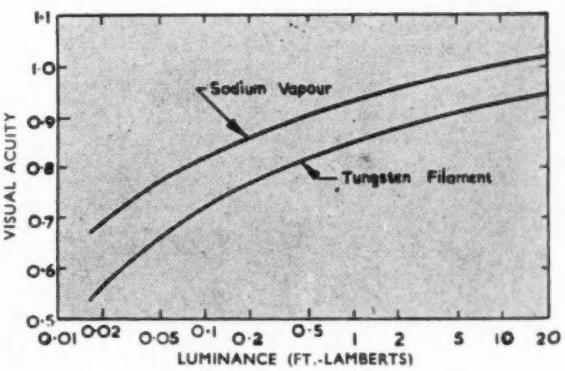
The importance of brightness in vision rested essentially on the fact that the illumination of the retina of the eye was proportional to the brightness viewed. Although this appeared self evident, a closer examination of the eye indicated that this simple connection was considerably modified by other factors. One of these was the value of the wavelength, i.e. the colour, which was being looked at. The effects of colour on glare and brightness were dealt with in the paper at considerable length.

It was pointed out that glare situations, in which the measurable effect on vision was nil or very slight, might nevertheless be most uncomfortable and might, in the long run, reduce the general efficiency and well-being of the individual. When this occurred, the discomfort would often show itself by other involuntary reactions in the body mechanism. These reactions could be the rate of blinking, variations in the pressure applied to a key on which the hand was resting, changes in the pulse-rate, and increases in muscular fatigue in the eye muscles.

A further method of assessing discomfort was "thoughtful appraisal" in which numerous observers were asked to express their considered opinion under various lighting conditions.

On the subject of specifying brightness in illuminating engineering, the Author thought that no useful purpose would be served by trying to introduce recommended luminances in place of recommended illuminations in the I.E.S. Code. The assessment of the appropriate size and reflection factor for particular tasks had been carried out "once and for all" by the compilers of the schedule of recommended values which gave the illuminating engineer the information he required in its most easily applicable form. It was in connection with glare that the main difficulties arose. Examination of the various formulae for disability and discomfort glare showed, however, that the effects could not be controlled by simple limits on brightness and brightness ratio. It was true that by sufficiently elaborate tables any of the experimental formulae could be put into a form usable in practice, but the illuminating engineer would no doubt prefer some simple rule even if it entailed departure to some degree from the original data.

The paper concluded by emphasising the fact that the increasing preoccupation of the illuminating engineer with brightness was a very real advance.



Luminance/visual acuity graph from Dr. W. S. Stiles' paper

Left to right: Dr. English (Holophane Ltd.); Mr. H. L. Logan (Vice-President Research, Holophane Co. Inc., New York); Mr. J. C. Holmes (President I.E.S.) and Mr. W. T. Souter (Holophane Ltd.) outside the Winter Gardens Pavilion after a meeting

Frontiers of the Art

The second paper, presented in the afternoon of Wednesday by Mr. H. L. Logan of the Holophane Company of New York, was aptly called "Two Frontiers of the Lighting Art." These frontiers or problems awaiting solution were (a) desirable or permissible brightness patterns within the visual field, and (b) development of a technique for predetermining the light conditions that lead to visual comfort.

The basis of the attack on problem (a) was to assume that as man had been most closely adapted to the climate of his origin, he tried automatically to reproduce those conditions wherever else he might be living. The locations of the "climate of origin" had been derived by S. F. Markham who concluded that they pointed to small areas along the 70° F annual isotherm. It was therefore justifiable to further assume that as man's physiological responses to temperature, humidity, air pressure and solar radiation so closely fitted the climatic conditions of the 70° F annual isotherm, and as these particular conditions determined the accompanying luminous conditions, the most desirable brightness patterns would exist in these areas. Investigations were therefore carried out to determine these patterns. An instrument was accordingly devised to measure the light flux from various zones within a field similar to that covered by the human eye, and an elaborate test routine established. Approximately 7,700 readings were made, and a range of variation of natural lighting distributions under optimum conditions was plotted for the various zones. This chart could be used as a guide by which artificial lighting installations could be checked.

In order to apply the outdoor measurements to interior lighting it was necessary to prepare a spherical perspective of the field of view and the method of doing this was fully described in the paper. The next step was to establish the brightness of the principal surfaces, and to convert these into light falling into the observer's eye. From this, a direct comparison with the established optimum could be obtained.

As all the natural scenes from which the flux diagrams had been developed were "comfortable" scenes, it was to be expected that the artificial scenes which met the criteria of the natural scenes would also be comfortable. Here, however, the solid angle at the eye subtended by natural objects was of importance, and these were generally larger than the angles subtended by objects viewed by artificial light. An intra-zonal check was therefore made. This, however, presented great difficulties in analysis and some divergence of opinion between various workers appeared. However, it was possible to obtain pertinent curves and unacceptable brightness could be computed and assessed.

In conclusion the Author pointed out that experience with the entire technique had demonstrated it to be a valuable aid in designing lighting installations where the nature of the project justified its application. Such installations included large schemes, small projects which were key situations in larger projects and repetitive projects.

The visual comfort phase of the technique was still "tentative" as some leaps had been made from the data to the completed visual chart, but it was held that experience had proved these leaps to be justified. Further work would, however, be needed to fill the gap.

Underwater Illumination

Recently the use of television to survey objects at great depths has aroused considerable public interest. Less spectacular but of great importance is the illumination of objects under water. This was the subject of the Thursday morning Paper given by W. D. Chesterman and J. B. Collins on "Problems of Underwater Illumination."

Sea water provided a great variety of optical properties, depending on the local environment, the general impression being that seeing underwater was rather like seeing in a thick smoke fog with visibilities at the most of 300 ft. At shallow depths, however, the haze top was quite close, and sunshine could give directional lighting and sparkle down to depths of 100 ft in clear water. The visibility range under daylight depended mainly on the amount of light scattered in the water. Much investigation had been carried out on the scatter, using photographic methods and this was described at considerable length in the paper.

On the question of light sources, sodium and mercury vapour lamps had proved better than tungsten for underwater duties. Sodium vapour lamps were about one and a half times as efficient as the mercury vapour lamp, but were only available in the lower wattages. The mercury vapour lamp, with the outer bulb in contact with the water, could be used down to 100 ft; a well-glass, however, was needed to protect the sodium lamp. So far fluorescent lamps had not been tried out. In tank tests it was found that a form of close-range floodlight was the most suitable and two sealed fittings were designed to use 250-watt or 400-watt MV/V-type lamps. A 45-watt (SO/H) sodium lamp floodlight was also designed as well as an experimental 140-watt sodium lamp floodlight.

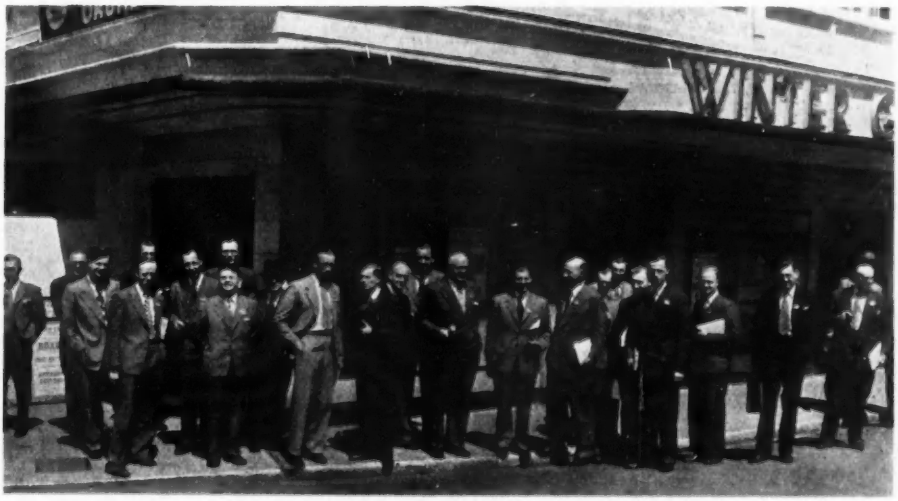
In general, in dirty water, it was preferable to use floodlights to silhouette the object or part of the object concerned provided an outline view was acceptable.

The paper concluded with some comments on the use of high-speed flash photography for the examination of moving objects under water.

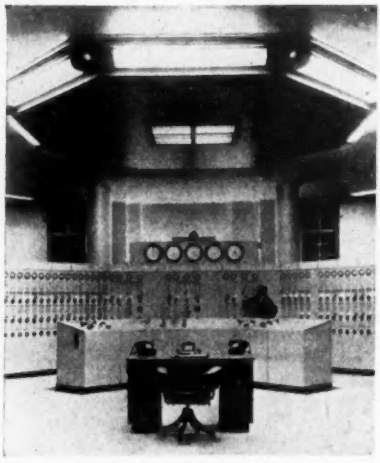
Comfortable Lighting

The Address on Thursday afternoon, following the Annual General Meeting, was given by Mr. L. C. Kalff of N. V. Philips Eindhoven. To a certain extent the ground covered in this address had been also covered by the second part of Mr. H. L. Logan's paper.

Fifteen years ago Ward Harrison asked, "What is wrong with our 50-ft candle installations?" No one had yet given a complete and satisfactory answer to this problem which it was now recognised is bound up with the achievement of what has been called "comfortable lighting." In this address Mr. Kalff postulated that to attain "comfortable lighting" one must approach the problem at least as much from the artist's point of view as from the engineer's or physicist's. He suggested that every visual task presents a pattern of lines, colours and brightnesses and that for "comfortable seeing" there were certain preferable arrangements of these three elements in relation to the three major divisions of the visual field, namely, the visual task, the immediate surroundings and the background. It was admitted that with our present knowledge this theory cannot be scientifically proved, but it was illustrated by reference to a number of typical examples and it was suggested that its acceptability should be further tested by field workers on an empirical basis.



Some of the delegates take a breather outside the Winter Gardens



An hexagonal cornice lighting scheme in a control room (from Mr. Hubble's paper)

Lighting in Schools

On the last day, Friday, two more papers were presented. The first of these dealt with the problems of lighting in schools and was given by Mr. Antony Pott. He pointed out that there was no need to argue the importance of good lighting in this field. The present School Premises Regulations required that all rooms should have a minimum level on the appropriate plane of 10 lumens/ft^2. American practice recommended 30 lumens/ft^2, but it should be remembered that our level was a minimum recommendation.

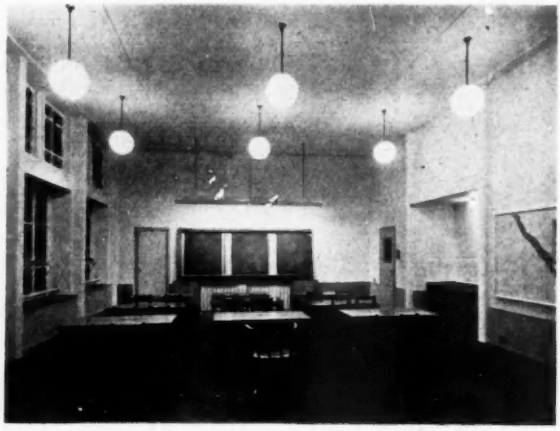
The essentials in the artificial lighting of teaching spaces were (i) to provide enough light on the work, (ii) to limit the brightness of the light sources and (iii) to relate the brightness of all the surfaces in the visual field so as to avoid excessive contrasts. Unduly restrictive limits of brightness ratios were not necessary to avoid discomfort and might lead to lighting which was unsatisfactory for other reasons.

There was need for simple, cheap and efficient fittings for use especially where low ceilings demanded more fittings than usual. Decoration and furnishing of rooms were essential factors in "visual environment" and needed to be considered in relation to lighting.

Finally, Mr. L. H. Hubble of B.T.H. dealt with the "Design of Interior Lighting Equipment." The object of the paper was to record major developments in interior lighting equipment, and in so doing to indicate the direction in which future developments were most likely to move. A short section was devoted to fittings in general use up to 1940 when the first impact of the fluorescent lamp was felt. The effective use of high-pressure mercury vapour lamps was considered and the value of horizontal burning lamps emphasised.

After discussing some of the problems in the design of standard fluorescent fittings, with a particular reference to the complication caused by the many different types required, brief analyses were given of the lighting units required for some special types of installation. For example, in a power station, the crane rail might be used as the main rigid structure for fluorescent lighting fittings built around it—commercial fittings had also been designed on this principle. Another interesting technique used composite fittings of metal and plaster, since plaster could be formed easily and cheaply to a desired curvature.

The Author believed that fundamental changes were now taking place in the mechanics of lighting practice which might have a far reaching effect on fittings design, but that progress might be hampered by too great complexity. Advances in lamps were inevitable and desirable, but every effort should be made to rationalise the design of lamps and components to assist the fittings maker in reducing some of the many variables in his equipment.



This installation of G.E.C. fittings at Nenwick Grove School, Worcester, is a excellent illustration of Mr. Pott's arguments

Problems and Practice
IN ENGINEERING

Loose Ends

FROM bitter experience the writer has come to the conclusion that one of the most pernicious diseases of the electrical system of a factory is temporary wiring. Like some fungoid growth trailing, untidy cords straggle along beams, disappear above ventilation trunking and hang in untidy loops from water pipes. They arrive at switchgear in untidy taped rope-like bunches, pass loosely through the hole, which is ideal for entry of water, to the contacts and collect dust.

From every point of view, with the exception of expediency, they are to be condemned. Once established they appear to breed rapidly, until a feeling of hopelessness prevails, and the electrician develops a considerable cunning in concealing the menace rather than eradicating it.

Why, then, are they tolerated? Well, production orders a change and time to effect it is limited. A layout is being listed and permanent wiring would be an unnecessary expense until approval of the scheme has been given.

And so the years pass with no diminution of the evil. If a factory inspector should notice the condition, management becomes indignant at maintenance and a panic tearing down begins and, after a short time, ceases with no substantial progress made.

The writer remembers ruefully the occasion on which he strode into the maintenance shop and with a pair of borrowed pliers snipped down yards of straggling cables leading to test points. These he left on the floor and marched out again. The silence with which thi incident was greeted was eloquent.

The next day, however, the foreman electrician placed a note on his desk with the remark, "There must be some mistake about this." The slip was an instruction to connect temporarily an urgent grinder required.

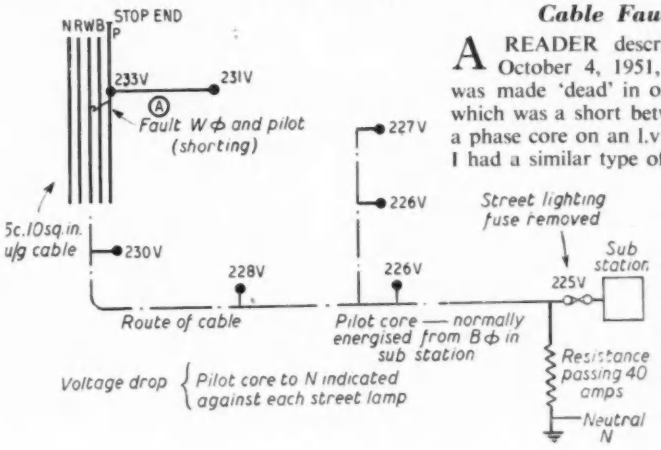
What can be done about it? The following suggestions have been of help.

1. No temporary wiring to be connected without the permission of the Works Engineer.
2. Every such job to be noted in a special sheet.
3. Once weekly, at a specified time, the W.E. and the foreman electrician shall read over this sheet and initial it. (This removes the plea of ignorance.) This sheet to be shown to the General Manager once every three months.
4. Production shall require to substantiate their case to have a machine connected with loose wiring.
5. A stock of a good quality flexible tubing shall be kept in the maintenance stores and, if practicable, this will be used for short run jobs urgently required. In all cases an external earth-wire shall be used.
6. The general impression to be given to maintenance personnel that temporary wiring is an evil, and that if it should stay in position for more than three weeks it represents a blot on their copy book.—*W.H.A.*

Cable Fault Location

A READER described in your issue of October 4, 1951, that the l.v. network was made 'dead' in order to locate a fault, which was a short between the pilot core and a phase core on an l.v. underground network. I had a similar type of fault to deal with and found the following method satisfactory. From the sketch it will be seen that the fault was located at (A) where the phase to neutral volts-drop was maximum. All street lamp fuses removed from lamp standard bases prior to test.

—*E.N.A.*



Open Day at the N.P.L.

Interesting exhibits include error reduction in the measurement of impulse voltage, electrically heated glass and electro-polishing

THE annual Open Day at the National Physical Laboratory always provides an opportunity to see precision workmanship and accuracy of measurement at its best. This year, with so much attention being paid to impulse testing of electrical equipment to assess its capability of standing up to surges, one of the most interesting exhibits was that dealing with the reduction of errors in measurements of impulse voltage.

Errors in Voltage Dividers

The normal method of deriving a voltage suitable for operating the oscilloscope recording the surge value, is to introduce across the test equipment a voltage divider. This divider may be constructed from resistors or capacitors: the essential requirement, however, is that the wave-shape of the rapidly changing phenomena should be faithfully reproduced at the oscilloscope with a reduction error which can be accurately determined.

With a resistance divider the error has been found to be a function of the product of the earth capacitance and the resistance of the high voltage arm. As this capacitance is governed by the physical size of the divider, which is in turn related to the crest voltage under measurement, the error varies roughly as to the square of the voltage rating. The response of the divider for a given voltage can be improved only by reducing the ohmic value of the h.v. arm or by compensating for the effects of earth capacitance by fitting a special h.v. electrode at the top of the divider to give a uniform capacitive voltage distribution along the surface of the divider.

Alternatively a series of capacitors may be added in parallel with the resistance units to form a mixed divider. This arrangement behaves as a capacitor divider with fast and as a resistor divider with slow transients.

Electrically Heated Glass

The deposition of metallic films particularly gold of extreme thinness upon ordinary glass in order to provide a conducting layer, has in the past proved disappointing, mainly because the electrical resistance has always been much higher than expected from the quantity of gold deposited. A new process invented at the N.P.L. produces films of a thickness of about $0{\cdot}25 \times 10^{-6}$ ins., but with a resistance of about $\frac{1}{10}$ that found by using normal methods. The optical absorption of such films is only half that found in the conventional techniques. A glass window thus coated is, therefore, not only reasonably transparent, but can be strongly heated by the passage of an electric current using only a moderate voltage. Small samples of this coated glass were shown, the heating being demonstrated by melting wax or boiling water upon them.

Surface Finishing

An interesting example of electrical techniques as applied to surface finish was being shown in the Metallurgy Division. A testing machine was recently acquired by the Division for which the standard size of specimen was only $\frac{1}{16}$ in. in diameter. With this small size the strains in the surface layer caused by machining could not be ignored, and the problem then arose as to how to prepare the specimens to have an accurately parallel gauge length and correctly curved ends. The solution lay in using an electrolytic polishing method. The specimen blank is rapidly rotated and also moved more slowly to and fro along its axis. A jet of suitable solution plays on the blank, and a current passing between the blank, as anode, through the jet to a cathode causes the blank to be dissolved away, gradually and uniformly, until the desired size is reached. With a suitable current and electrolyte, the surface produced is highly polished and is free from irregularities.

Work is also being carried out in the Electricity Division on the precision measurement of dielectric constants of pure liquids. As these measurements are carried out on a comparison basis, it is important that the dielectric constant of one liquid at least should be known with the highest possible accuracy.

A special test cell has been developed in which the capacitance in air is compared with that when the cell is filled with distilled benzene. Measurements are being made in the first place at 1,000 c/s and over a temperature range from 5° C to 30° C.

SCOTLAND BUILDS *for Water Power*

Hydro-Electric Plant for Export a Feature of Clydeside Works

IN 1947 the Scotstoun works of Harland and Wolff, at Glasgow, began the manufacture of hydro-electric machinery, under the guidance of the English Electric Company. The initial encouragement came from the North of Scotland Hydro-Electric Board, who wished to have the machinery they were to use manufactured in Scotland: now, five years later, the output of this Scottish factory is going not only to the Highlands, but also to many parts of the world as a major part of the electrical manufacturing industry's export effort.

We were privileged last week to see the progress that had been made at Scotstoun, the occasion being a visit paid to the works by Mr. T. Lawrie, General Manager of the North of Scotland H.-E. Board. Impulse turbines and reaction turbines of the Francis and Kaplan types are in course of manufacture, together with the alternators which they are designed to drive and control, and governor gear.

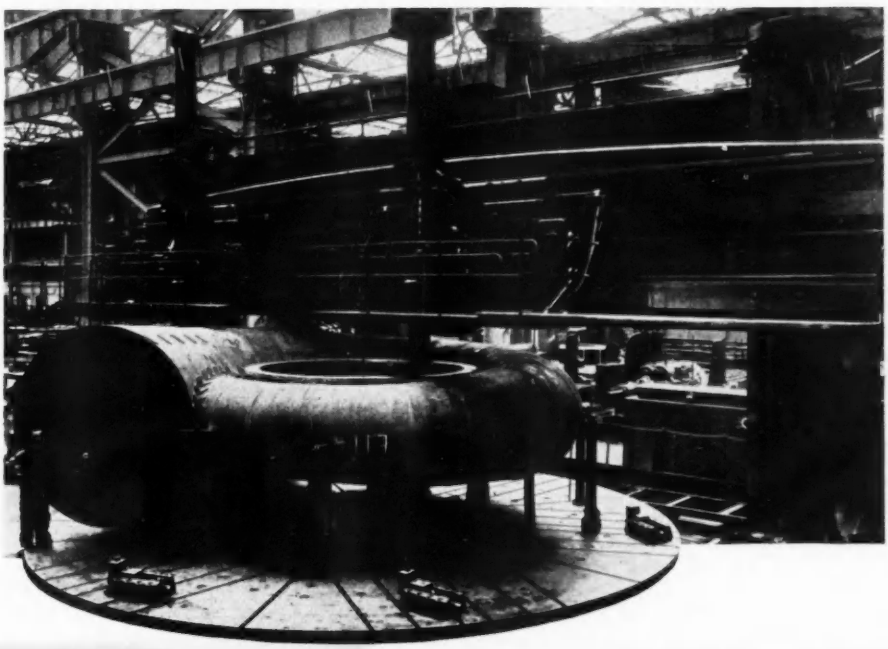
Only machining, fabrication and assembly are carried out at the works, all castings and most forgings being received from outside manufacturers. The impressive range of machine tools available extends up to a 35 ft diameter vertical boring mill which will grind, turn and rotary slot. This is claimed to be the biggest such machine in Scotland.

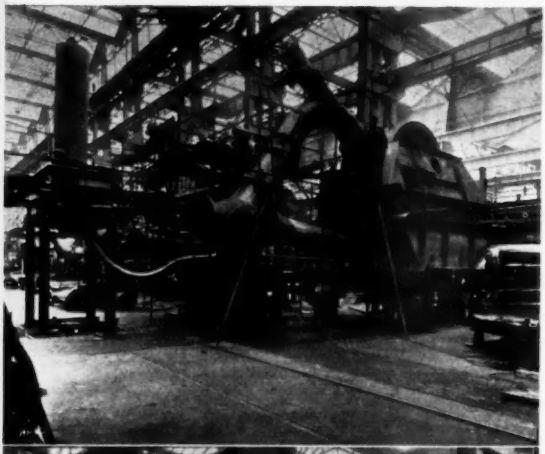
Spiral Casings

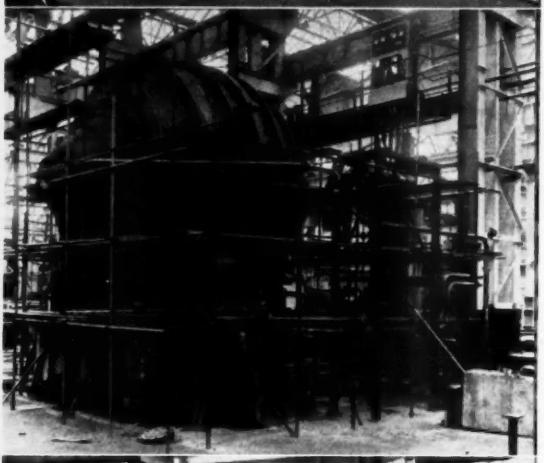
Bending and rolling machines of heavy capacity are used for the preparation of plates for the spiral casing of reaction-type turbines. Templates for use on these jobs are made directly on a basis of calculations, rather than by drawing out in a mould loft. Welding of the sections is checked where necessary by portable X-ray machines.

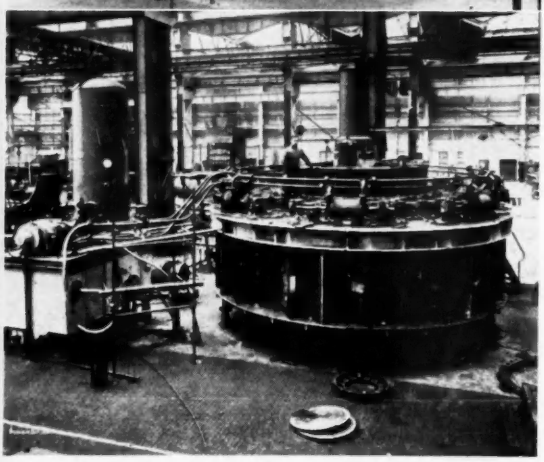
Electric sheet steel for laminations is stamped out in the works and then insulated as necessary with a flour and china clay compound, and baked. Field coils are wound from wide copper

This view of a spiral casing for a **16,750** *h.p. reaction turbine for Luichart undergoing a machining operation is typical of the size of work to be seen in the shops at the Scotstoun works*









From top to bottom these views show an impulse turbine for Corado, Portugal, the 11 ft valve for Castelo-do-Bode, and, at the bottom, the speed ring for one of the 19,200 h.p. Khatima turbines. The last view gives a good impression of the mechanism which operates the valves to control speed

tape on formers, and armature coils are prepared somewhat similarly, a jig being used for bending after the copper has been cut to length and its ends tinned. Insulating tapes for the coils are prepared in the works, and women are employed to make up the coil groups. It is a tribute to the successful way in which the Scotswomen have adapted themselves to this new work that much of their output is exported to England and used for alternator construction at the English Electric's main works.

Largest Valve

Notable amongst the work seen on the floor of the shop was an 11 ft straight-flow valve for a 62,000 h.p. turbine at Castelo-do-Bode, in Portugal (ELECTRICAL TIMES, 1 Feb., 1951, p. 170). This valve, believed to be the biggest of its type yet made in Great Britain, was being prepared for shipment. Another Portuguese order was for El Picazo, and consisted of the spiral casing and a straight-flow valve for a 12,850 h.p. turbine, while there was another valve for the Peninsula in a straight-flow unit for a 44,000 h.p. turbine at Salime, Spain. Amongst the electrical equipment seen was a completed alternator stator for El Picazo, together with the core of another ready for winding.

Another overseas installation of interest is that at Khatima, in India. A 19,200 h.p. Francis reaction turbine is being built for this project, and the runner was seen being machined on the 35 ft boring mill mentioned above. This turbine is especially interesting because it is designed for use in connection with an irrigation scheme, and in addition to the guide vanes normal for a Francis machine, shutter vanes are being provided. These are fitted with a rubber sealing strip down their edges.

The one impulse turbine (Pelton wheel) seen under construction was also intended for an Indian scheme, this time that at Sengulam. It was an 18,000 h.p. unit, and the wheel and buckets had been machined from a solid casting. Examination for cracks had been made by magnetic crack-testing techniques. The spears for the nozzle controls were also seen; they were provided with steel tips, with retractable diffusing segments on the shaft.

One item remains unmentioned in the export work going through: this was the spiral casing and speed ring for a 42,000 h.p. unit intended for the extensive Snowy Mountain scheme in south-east Australia.

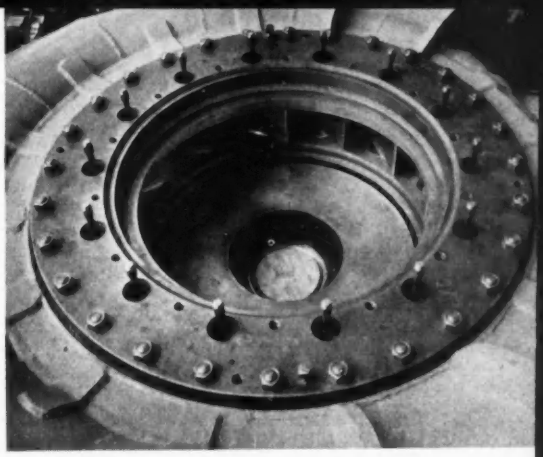
Largest of the several units being built for the North of Scotland Hydro-Electric Board was a 56,000 h.p. reaction turbine and 40 MW

alternator for the Clachan station in the Glen Shira project. The spiral casing and the top cover for the turbine were in course of construction, and the alternator was well advanced. To ease transport and ensure homogeneity, the body of the alternator was divided into four "cheeses," each weighing about eight tons. At site these were to be shrunk on the shaft of the machine. The stator was being wound in halves, and this work was nearly completed.

Next in order of size came two 16,750 h.p. turbines for Luichart, a station near Inverness, which is to have 12 MW alternators. The spiral casing for one of the machines was standing placed together in the shops, together with the generator support, ready for testing. It was to be transported in separate sections for final assembly on site. Runners for the machine, some eight feet across, were in the shops in finished state.

Two other North of Scotland stations were represented: Gaur, for which a 5 MW alternator was being built up, and Gron Mor, for which a 6,950 h.p. turbine was in course of construction. The runner for this unit was seen being machined.

Amongst other interesting items in the shops were complete governors and components,



Close-up view of the spiral casing for a horizontal turbine

some set up for hydraulic test. As a change from hydro-electric plant, there were some examples of condensers being built for steam generating stations. On average, one condenser is being built a month.

Speaking at Scotstoun, Mr. Lawrie called the present stage of development the third step in the expansion of the industry in Scotland. Four years ago only 350 people were employed, but by 1952 employment had expanded to the 1,000 mark.

Ratings for Circuit-Breakers

FOR the British engineer, the rating of a circuit-breaker in MVA interrupting capacity at a given voltage is a straightforward matter. It is known that the symmetrical component of the fault current is under consideration, and that the breaker will have been tested with appropriate degrees of current asymmetry. Unfortunately, the same numerical rating applied to a switch of American manufacture may mean something quite different. To elucidate this point, the Association of Short-circuit Testing Authorities have now issued an up-to-date comparison* between the standards of the two countries.

The appropriate American standard, it is stated, uses asymmetrical current for rating purposes. If the modest proportion of a 50% d.c. component is assumed (the minimum allowable in British asymmetrical tests), then the symmetrical breaking capacity of an American-rated switch is not more than 81·5% of its asymmetrical breaking capacity. An 80% d.c. component reduces the proportion to 66·2%.

In practice, the scales are not weighted quite so heavily in favour of the American breaker. The British practice is to choose a breaker that will have the appropriate rating for a symmetrical three-phase fault: for an American breaker a rating is chosen to match the three-phase symmetrical fault multiplied by a factor that varies from 1·0 for a breaker opening in eight cycles, to 1·4 for a two-cycle breaker, adjustment being made if the fault is at generator voltage.

On balance then, there is an easing of standards in the American case, and this is extended to many details of test. The American standard, for instance, does not demand a symmetrical current breaking capacity test, nor does it specify a making current. Recovery voltage on test is required to be 95% of rated voltage up to 500 MVA, while the corresponding American limit is 85%. Furthermore, it is U.S. practice to use the applied voltage rather than the instantaneous voltage in calculating MVA broken, and this may lead to very optimistic results.

This valuable booklet concludes with appendices setting out comparative ratings of British and American circuit-breakers connected for the same duty, and summarising the differences between the two codes of test requirements.

* "*Comparison Between British and American Standards for the Short-circuit rating, performance selection and testing of oil Circuit-breakers*," *Published by A.S.T.A., 36 Kingsway, London W.C.2, price* 10*s.*

The E.A.W. Conference

FREEDOM OF CHOICE FOR THE CONSUMER DEMANDED

AN emergency resolution demanding that "electricity should be made more widely available at the earliest possible moment, for home, industry, commerce and agriculture and for every other aspect of modern living to which it can contribute so greatly" was unanimously approved at the twenty-seventh annual conference of the Electrical Association for Women, held at Scarborough last week.

Introducing the resolution at the Association's A.G.M. on Wednesday morning, Dame Caroline Haslett, D.B.E., J.P., director, said that there had been a great deal of discussion in Parliament and in the Press about the fuel situation, and a committee under the chairmanship of Viscount Ridley had been set up to consider adequate measures to protect the country's fuel and power resources. The E.A.W. wished to put evidence before that Committee. Whatever the Government's decision, there should be freedom of choice for the consumer, continued Dame Caroline. In the meantime, many of the members were very disturbed by a statement which would seem to indicate that the use of electricity for all purposes was not in the best interests of the country. It seemed extraordinary that so many male voices were advocating a return to the conditions of 27 years ago, Dame Caroline commented. Afterwards the annual report was presented; the chief officials were re-elected.

At the open session on Wednesday afternoon, the Dowager Lady Swaythling, president, welcomed the Mayor and Mayoress of Scarborough (Councillor and Mrs. J. W. Hardcastle), Mr. H. H. Mullens, B.Sc., M.I.E.E., chairman of the North Eastern Electricity Board, and Mr. O. W. Humphries, B.Sc., M.I.E.E., F.Inst.P., director of the G.E.C. research laboratories, who gave a very interesting address and demonstration on "The Electron and Some of Its Applications."

Speaking at the annual luncheon on Thursday, the Rt. Hon. Lord Citrine, P.C., K.B.E., companion I.E.E., chairman of the B.E.A., remarked that critics too often confused the peak load problem with the overall consumption of electricity. To ask people to keep off the peak was one thing. It was quite another to advocate that consumers should not use electricity at times when the Authority could supply all the current they required. Taken over the 24 hours, the generating plant was used to its full capacity for about half the time. If means could be found to induce people to spread their use of electricity so as to keep the plant in much more continuous use than it is now, tariff reductions could be made.

Any substantial curtailment in the sale of electricity would result in a steep increase in price to the consumers. Without the expansion of domestic consumption the cost of industrial supplies would be considerably higher than at present. The financial stability of the electricity supply industry would be seriously undermined if people who advocated a rise in prices to stop consumers using electricity, and thereby curtail the expenditure on generating plant, had their way, he went on.

The Mayor of Scarborough chatting with Mme. C. Cossus (representing Electricite de France)

Developments in the Highlands

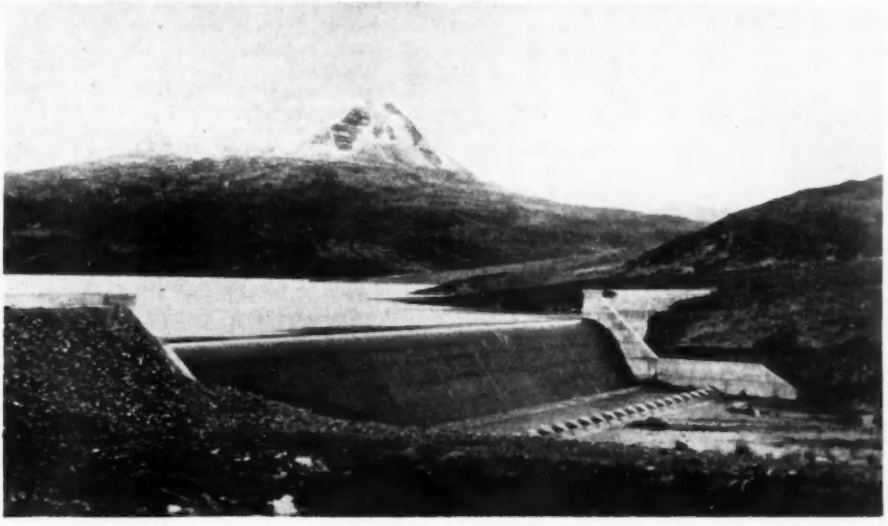
Skye and Gairloch hydro schemes officially inaugurated

TODAY, May 29, sees the official inauguration of the Kerry Falls (Gairloch) hydro-electric scheme of the North of Scotland Hydro-Electric Board. This project, one of the earliest prepared by the Board (it was part of constructional scheme No. 2), provides a local supply for the coastal area of Ross and Cromarty from Gairloch to Aultbea. The station, which in its first stage has a capacity of 750 kW, utilises the River Kerry. The turbines were made by Gilkes and Gordon and the alternators by Bruce Peebles. Ultimate capacity of the project is put at 3,000 kW.

The other new hydro-electric scheme of the Board, the Storrs Loch, Isle of Skye, project, is to be inaugurated on Saturday next, May 31, by Lady Rachel Stuart. This is the Board's first h.e. scheme in the Western Isles, and its cost is approximately £250,000. The project utilises the waters of Loch Fada, Loch Leathan and tributary streams, by the erection of a gravity type dam 170 ft long and 36 ft high. From there water is led to the power station on the sea-shore near the mouth of the Bearreraig River. This station is to have three 800 kW horizontal Francis turbines made by Gilkes and Gordon coupled to Bruce Peebles alternators. These sets operate on a head of 447 ft. The output, estimated at 5½ million units annually, will be distributed throughout Skye via 178 miles of high voltage and 151 miles of l.v. lines to make a supply available to 70% of the population. The first stage of this station consists of one 800 kW set, and the second stage will increase the installed capacity to 2,400 kW.

The power station of the Storrs Loch scheme near the mouth of of the Bearreraig River, Skye

Kerry Falls hydro-electric scheme, Gairloch. Slioch (3,217 ft) is seen in the background



overseas news

Too Slow and Too Dear

Australia is building power stations too slowly and at too great a cost, declared Mr. V. Brain, chairman of the Electricity Authority of New South Wales, at an engineers conference in Sydney earlier this month. Americans were building power plants for about half the Australian cost in man hours, he added, and referred to two of Australia's largest power stations, Lake Macquarie and Tallawarra, both within a morning's walk of steelworks, which were being built almost completely with imported steel because local steel could not be obtained. Mr. Brain said it was often overlooked that food production, via irrigation, was the main object of the Snowy River scheme. Snowy power would be economical, but not really cheap, and its limited part in the total load of south-eastern Australia would prevent it from revolutionising power costs in N.S.W. The main contribution of the Snowy scheme would be an easing of the steam power station construction programme, valuable saving in coal, and establishment of underground generating plant which would be invulnerable to air attack, he added.

Borrowing Bill

Despite some opposition the Legislative Council has agreed to clauses in the Hydro-Electric Commission of Tasmania Bill providing machinery for the Commission to raise £3,000,000 by semi-Government loans. It also approved an increase in the Commission's overdraft limit from £100,000 to £1,000,000. It was pointed out that all the semi-Government loans would have to be approved by the Loan Council.

Selling Equipment

There is some concern in Melbourne following the revelation by Mr. R. H. Hunt, chairman of the State Electricity Commission of Victoria, that the recent loan cuts have left £6,000,000 of the Commission's equipment lying idle, and most of it will have to be sold. The plant is mainly earth-moving equipment such as tractors, tracks, etc.

Extension at Niagara

Because of "hobbling" of proposals for the St. Lawrence River power development, the Hydro-Electric Power Commission of Ontario is to go ahead immediately with plans for construction of a second tunnel under the city of Niagara Falls and expansion of the new Queenston power station. Mr. R. H. Saunders, chairman of the Commission, stated a few days ago that work will be started very shortly instead of in 1956, as originally planned. This second tunnel will be finished in about two years and will mean the installation of an additional five generating units at the new Queenston power station, where work has been proceeding in seven units. With this extension to a total of 12 sets, the new station will have a capacity of 1,200,000 h.p. The first tunnel was started last year and should be finished in 1954.

Alberta H.-E. Plans

Proposals for ten more power plants on the Bow River, Alberta, with a total capacity of 366,000 h.p. (almost twice the installed capacity of the existing eight plants), were placed before the Royal Commission studying the causes of flooding of the river, by Calgary Power Ltd. earlier this month. The largest of the projects, of 120,000 h.p., would be at Shepard, about eight miles west of Caseland, while the smallest, of 4,500 h.p., would be at Interlakes, near the head of the Kananakis River. It was emphasised that such development would depend entirely on the demand and whether a competitive source of power was available.

Speedy Buying

A recommendation that the Bulawayo City Council's special purchasing committee be allowed to buy urgently required electrical material when it becomes available without first getting a recommendation from the Electricity Committee, has been made by the Finance Committee. This recommendation was made after the Electricity Committee had reported that the supply position has deteriorated seriously during the last few months, and that essential distribution materials, notably cable, had been put back 12 months or more. But sources of supply had been found and the Electricity Committee needed authorisation to make quick purchases.

Copper Black Market

Thieves operating a black market in copper were referred to by Mr. A. R. Sibson, chairman, at the convention of the Association of Municipal Electricity Undertakings in South Africa earlier this month. Cable manufacturers had suggested that scrap copper from municipal undertakings should be sold to them for return in the form of new cable, but this was counter to municipal practice, which was to sell by tender or auction. He urged a revision of the practice. Mr. J. C. Downey, town electrical engineer of Springs, instancing the daring of thieves, said that in the mines area a fence had been cut and complete drum of cable rolled out; a power line was deadened, and the whole line removed. On a third occasion, a

trench was opened and a length of new cable "whisked away."

Mechanisation Needed

In another paper delivered at that convention, Mr. R. H. Redman, deputy city electrical engineer of Bulawayo, said that in 1961 a winter peak demand of 130 MW is anticipated, compared with last year's peak of 38·4 MW which was 12·95% above the previous year. After referring to the city's increasing population, he remarked that at present a certain dependence on native labour existed in both the Lobengula Street and 13th Avenue power stations, and this at one time was an economy, but it is doubtful whether it is today. Also, native labour is becoming scarcer as time passes, with the attraction of easy and more congenial work in industries. Recently contracts have been placed amounting to about £32,000 for mechanisation of the coal-handling at Lobengula Street. A coal handling scheme for the 13th Avenue power station is under consideration, he went on.

Extension

The largest municipal oil-burning power station in Southern Africa is being erected at Windhoek. It is estimated that its final output will be 5,000 kW, and will cost approximately £300,000. It will serve the municipality, six fish-canning plants, harbour installations and other industrial undertakings planned for Walvis Bay.

Objection to British Preference

The Auckland Electric Power Board has decided to delete the British preference clause from its specifications when calling for tenders in future. This follows complaints from a Dutch firm whose tender was recently rejected in favour of a higher British tender. It was stated at a recent meeting, when a committee recommendation to make the change was adopted, that British goods would no doubt continue to be favoured.

Costs Still Rising

A surplus of £20,074 for the year, after providing for all charges, including interest and principal repayments, is reported by the North Auckland Electric Power Board. That figure is £4,281 greater than for the previous year. Mr. R. A. Murdoch, chairman, has said the board should be able to absorb any further rising costs, with one exception, without having to increase its charges to consumers. The exception was the substantial increase in charges for bulk supply, forecast by the State Hydro-Electric Department.

Geothermal News

The latest news concerning the geothermal experiments, is a report that work on a pilot plant at Wairakei, with a generating capacity of between 2,000 kW and 10,000 kW, may be started this year. Data is now being collected to determine the design of the turbines needed to use the natural steam. None of the bores drilled so far has produced enough steam to drive the pilot plant on its own. Unless a sufficiently powerful steam jet is found—and this is also unlikely—a series of bores will be connected to drive the turbines. The latest bore is the deepest and most powerful drilled yet. From 1,500 feet underground it is producing a column of steam which engineers are now by-passing so as to connect the instruments which will measure its force. At present the steam column roars 150 ft to 200 ft into the air. Wairakei steam is not so highly charged with chemicals as that in the Italian geothermal region of Lardarelo.

Steam Plant Plan

The New Zealand Government has plans to make test borings of an area in the Waikato coalfields to confirm it as a possible site for a steam power station. A combined project between the State Hydro-Electric Department and the Mines Department, it is being discussed at Cabinet level. The primary requirement is an adequate supply of coal which can be mined at low cost. Mr. C. M. Gray, chief engineer of the Waitemata Power Board, stated recently, that he understood the plant could be operating within four or five years of the order being placed. He advocated the placing of orders for a 100,000 kW station as soon as possible, even if the prospects of using geothermal power were good.

Japan's Need

Confidence that the foreign capital required to develop the electric power resources of Japan would become available, has been voiced quite recently by the Japanese Prime Minister, Shigeru Yoshida. Speaking at a meeting of the Japan Chamber of Commerce, he also asserted that production costs would have to be reduced to enable Japan to compete on the world market, and the best way to achieve that was to provide electricity in abundance. It was subsequently stated that a further 3,000 MW of plant, costing about 300,000 million yen, was needed. There are two large generating sources in the Dadamigawa and Tenrya rivers. The latter offers the easiest access to construction materials and labour. The Central Japan Electric Power Co. in Nagoya has recently arranged for an American firm of consulting engineers to survey the Sakuma Dam on the Tenrya, where the generating capacity is estimated at 300 MW. If the scheme goes ahead, the power company plans to use indigenous materials and equipment.

New Guinea Scheme

A contract, valued at nearly £63,000, for three 1,000 kW water-driven turbo-alternators for the Port Moresby hydro-electric scheme has been placed with the Australian General Electric Co., it is reported. Each machine will comprise a horizontal Francis turbine made by Boving and Co., directly coupled to a Metropolitan-Vickers 1,000 kW alternator. The plant will be installed on the Laloki River, 14 miles from Port Moresby. Water will be taken just below Laloki Falls via a canal to a fore bay above the power station. This new station will replace the existing diesel plant.

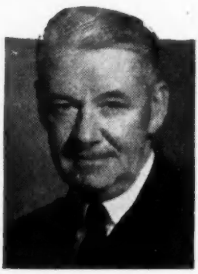
PERSONALITIES

IN THE INDUSTRY

We offer our congratulations to **Mr. Arthur Leggett,** M.B.E., M.I.Mech.E., M.I.P.E., chairman and managing director of E. R. and F. Turner Ltd., and Bull Motors Ltd., who recently completed 60 years' service with the company. To mark the occasion, his fellow directors gave a dinner in his honour at which presentations were made both on behalf of the company and also by his colleagues on the board. Tributes were paid to Mr. Leggett by the Mayor of Ipswich, Alderman A. J. Colthorpe, J.P., and Mr. E. Robson, president of the local Association of Engineering and Allied Employers, to which Mr. Leggett replied in his own inimitable way.

Mr. A. Leggett

We learn that **Mr. Walter Symes** has resigned from the board of Metropolitan-Vickers Electrical Co. Ltd. and from the position of works manager at Trafford Park works in order to take up the appointment of manufacturing consultant, Associated Electrical Industries Ltd. He will be available to all the A.E.I. group companies on general manufacturing problems. His successor as works manager at Trafford Park is **Mr. Arthur C. Main,** M.I.E.E. (previously the assistant works manager), who has also been elected a director of Metrovick. Mr. Symes went to Trafford Park from the B.T.H. Rugby works in 1914, and after serving on mechanical and electrical design turned to the study of manufacturing processes, and on the formation of the M-V Process and Ratefixing Department, he was appointed assistant superintendent. He later transferred to a manufacturing department on switch and control gear as assistant superintendent, and in 1935 became superintendent.



Mr. W. Symes

Mr. A. C. Main

He played a prominent part in expanding production of armaments during the war, and in 1944 was appointed works manager, Trafford Park works, and has since been largely responsible for planning factories extensions. Mr. Main was born and educated at Adelaide, and joined M-V as a college apprentice at Trafford Park in 1925. He became foreman of the Electrical Control Gear Test Department and after a period in the Process and Ratefixing Department, transferred to Switchgear and Control Department. There he became assistant superintendent in 1935, and three years later the Radar Department was included in his duties. In 1944 he was appointed superintendent of the Switchgear, Control and Radio Departments, and he has been assistant works manager, Trafford Park works, since February, 1949.

At present progress and planning engineer (Acton Works), London Transport, **Mr. J. G. Bruce,** B.Sc., A.M.I.E.E., A.M.I.Loco.E., has been appointed acting assistant mechanical engineer (works) in the department of the chief mechanical engineer (railways). He started with London Transport as an engineering trainee in 1935, and after joining the technical staff, became section controller in charge at Northfields depot in 1940. Since then he has been successively assistant production engineer at Acton works, production engineer, and progress and planning engineer. London Transport also announce that **Mr. G. Clark,** at present acting production engineer, has been appointed production engineer (Acton works). He started with the London Electric Railway in 1923.

Mr. J. G. Bruce

Mr. Y. A. Fazalbhoy, managing director of General Radio and Appliances Ltd., of Bombay, was re-elected president of the Electrical Contractors' Association in India for the current year at the annual general meeting of the association held earlier this month. He has held that office since 1950.

Sir James Reid Young has been appointed chairman of Vickers Armstrongs Ltd. in place of Commander Sir Robert Micklem, who died recently. Other appointments are Maj.-Gen. **C. A. L. Dunphie,** managing director, engineering works and shipyards, and **Mr. E. J. Waddington,** director of administration.

A private luncheon attended by many personalities in the radio industry was held last week, at which the guest of honour was **Mr. R. D. Bangay,** now foreign manager of Marconi's Wireless Telegraph Co., who has just celebrated his fiftieth anniversary in the wireless industry, as we recorded in our May 1 issue. Fittingly, he was presented with an English Electric television receiver by **Sir George Nelson,** M.I.E.E., M.I.Mech.E., chairman of the English Electric Group of which Marconi's is a member. The guests included **Sir Noel Ashbridge, Mr. J. M. Furnival,** M.B.E., general manager of the Marconi Instrument Co., **Mr. C. E. Rickard,** a former chief engineer and general technical manager of Marconi's, **Capt. H. J. Round** and **Major C. E. Prince,** all of whom are well known personalities in the radio industry.

Inventor of the original vacuum cleaner in 1901, **Mr. H. Cecil Booth,** F.C.G.I., M.Inst.C.E., who is now in his 81st year, announced last week that he is shortly to retire from the position of chairman of the British Vacuum Cleaner and Engineering Co.—an office he has filled for the past 40 years. Mr. Booth added that the senior joint managing director, **Mr. J. J. Hambidge** has been appointed by the board to the office of the deputy chairman.

Mr. P. W. V. Fright, London sales manager to the Jackson Electric Stove Co. Ltd., will be retiring on May 31, after upwards of twenty-three years' service. Mr. Fright joined the sales staff of the company in 1929 and was appointed London sales manager in 1935. His personality and help will be missed, not only by the staff, but also by his many friends in the industry who will join in wishing him a long life and a happy retirement. It is further announced that **Mr. T. G. Clarson,** Birmingham branch manager of the Jackson Electric Stove Co. Ltd., will also be retiring on the same day. Mr. Clarson held the appointment of industrial engineer to the City of Winnipeg Light and Fire Department from 1909 to 1914. After war service he joined, in 1921, Metropolitan Vickers Electrical Co. Ltd., where he was in charge of domestic appliance sales. He went to the Jackson Electric Stove Co. in 1924, and was appointed branch manager at Birmingham in 1929. After 23 years in that position he has many friends, particularly in the Midlands, from where many good wishes come for his happy retirement. **Mr. K. A. Aldridge,** who joined the Jackson Electric Stove Co. in October, 1949, will take over the management of the Birmingham office on the retirement of Mr. T. G. Clarson. Mr. Aldridge will be assisted by **Mr. D. C. Bradbury** as representative in that area.

Mr. P. W. V. Fright

Station superintendent at Battersea power station, London Division of the B.E.A., since 1945, **Mr. H. J. Taylor,** B.Sc.(Eng.)(Hons.), A.K.C., A.M.I.E.E., is retiring on June 26 next. He is being succeeded in that position by **Mr. H. Griffin,** who now occupies a similar post at the Division's Deptford East power station. Mr. Taylor started as a technical assistant in the meter and testing department of the Metropolitan Electric Supply Co. in 1908, but two years later turned to the generation side, serving at Metesco's Paddington station. After a period at the Holborn rotary substation, in the company's drawing office, and again at Paddington, he went to the Acton Lane generating station in 1915 as shift charge engineer, ultimately becoming, in 1925, the station superintendent there, continuing in that position when the station was taken over by the London Power Co. in 1927, and serving there till going to Battersea in 1945. Mr. Griffin, who takes over at Battersea from July 1, served as a pupil with the Mansfield Corporation, afterwards holding positions at Rotherham, Doncaster and Wolverhampton, and in 1929 joined the former London Power Co. at Deptford West. There he was turbine room superintendent for some years before transferring to Deptford East in 1946 as deputy station superintendent. He has been station superintendent there since 1948.

Mr. H. J. Taylor

The Kersons Manufacturing Co. Ltd., announce the appointment of **Mr. N. C. Ridge,** of 35 The Paddocks, Wembley Park (Tel. Arnold 1613) as their agent for London and the Eastern Counties.

Mr. Charles Ramsden, overseas director of the F.B.I., has retired after 33 years' service with the Federation. His successor is **Mr. Peter Tennant.**

Mr. H. G. Herrington has been promoted managing director of High Duty Alloys Ltd. Since 1930, he has been general manager of the company, and from 1937, a director. He is also on the board of the Aluminium Wire and Cable Co. and other concerns, and is president of the Council of the Aluminium Development Association. His earlier experience was gained in the machine shops of B.T.H. and Coventry Premier, after which he joined Sterling Metals iron and aluminium foundries.

Mr. H. G. Herrington

After 25 years' service with the British Broadcasting Corporation, **Sir Noel Ashbridge,** B.SC., M.INST.C.E., M.I.E.E., F.K.C., F.I.R.E., director of technical services, is to retire next month. He originally joined the B.B.C. in 1926 as assistant chief engineer after about six years with Marconi's at the Writtle experimental station. At the B.B.C. he has successively held the positions of controller of engineering, deputy director-general and, since 1948, director of technical services. He has served on many technical committees and is a past president of the I.E.E. and of the Junior Institution of Engineers.

Sir Noel Ashbridge

At present head of the Physics Section of the Research Laboratory of the British Thomson-Houston Co., **Dr. C. J. Milner,** M.A., PH.D., F.INST.P., has accepted an invitation to the Chair of Applied Physics at the New South Wales University of Technology. Dr. Milner has been responsible for many applications of physics to industrial development, including a new process for the production of sheet steel. During the war he was seconded to the D.S.I.R. and worked at the University of California on the electromagnetic process for isotope separation. Earlier, before going to B.T.H. in 1936, he did research at Cambridge University under the late Lord Rutherford and Sir John Cockcroft.

It was announced on Monday that the managers of the Royal Institution had accepted the resignation of **Professor E. N. da C. Andrade,** F.R.S., from the offices of Director in the Royal Institution, resident Professor in the Institution, Fullerian Professor of Chemistry, Superintendent of the House, and Director of the Davy Faraday Research Laboratory. He had been Director of the Institution since January, 1950. Lord Brabazon, President of the Institution, made it clear that Prof. Andrade's resignation was the upshot of long differences of opinion in which administration matters only were concerned.

Winner of the Golf competition at the E.A.W. Conference at Scarborough last week was **Miss E. Fenwick,** of Sunderland. The runner-up was **Miss N. Kenyon.** Miss Fenwick was presented with the Lady Hughman Challenge Bowl by **the Dowager Lady Swaythling.**

Newly elected president of the Illuminating Engineering Society is **Dr. W. J. Wellwood Ferguson,** an eminent ophthalmologist, of Sheffield University. The vice-presidents are Messrs. A. G. Higgins, E. C. Lennox, A. H. Owen, J. F. Stanley, and W. J. P. Watson. The new members of the council are: Messrs. A. D. S. Atkinson F. M. Hale, R. G. Hopkinson, R. A. Lovell, J. S. McCulloch, W. T. F. Desoutter, W. R. Stevens and D. L. Tabraham.

OBITUARY

Mr. J. S. Niven, director and secretary of James Howden and Co. Ltd. died on May 25.

PLANT ENGINEERS CONFER

GET back to being British. This somewhat startling recommendation comes from the presidential address which Mr. G. A. ROOLEY, A.M.I.Mech.E., M.Inst.E., delivered to the Incorporated Plant Engineers at their annual conference at Harrogate last week. In his review of the responsibilities of the plant engineer, Mr. Pooley stressed that they were responsible for between 4½ and 20% of production costs. He suggested that in the post-war period the Britisher had been too introspective and self-critical. What was needed was a realisation that we had the greatest skill at improvisation and the best engineers.

The plant engineer recognised his responsibility, as the growth of the Institution to a corporate membership of 2,500 in six years showed.

Discussion Groups

Amongst the discussion groups into which the conference split was one concerned with fuel and power. This subject was introduced by Mr. J. C. VEALE, M.Eng., A.M.I.Mech.E., M.I.Plant. E., who suggested as criteria in considering power problems: overall economy, fuel economy (in the national interest), increase in production, welfare and safety, independence of outside authorities, ease of maintenance, and co-operation with process men.

On this basis of judgment, the steam engine driving lineshafts had a great deal to be said both for and against its use. It was by no means always the best move to replace such an installation, if it was working economically, by independent drives with electric motors on outside supply. Often the correct answer was to let the existing engine drive an alternator.

For any works requiring a substantial quantity of steam, the back-pressure steam engine driving an alternator should be a paying proposition. A difficulty that arose was the inability, "in the absence of a co-ordinated national fuel policy," of the electricity authority to offer reasonable terms for a standby supply.

Finally, in all cases it was necessary for the engineer actively to sell his recommendations to management. Persuasion was part of the job, and by not getting his ideas over, the engineer could be badly at fault.

POWER FOR STEEL

I.E.E. Lecturer suggests improvements needed in steelworks wiring, control gear and motors

IRON and steel production is amongst the largest single use to which electricity is put in this country, and so it was natural to expect that a works engineer from that industry would have much to say of interest to the electrical engineer. This forecast proved justified when Mr. W. F. CARTWRIGHT (Director and General Manager, Steel Company of Wales) delivered the annual lecture to the I.E.E. Utilisation Section last week. Speaking as "a mechanical engineer and an operator," he was not only informative, for he had some provocative things to say that have a bearing on electrical design.

Mr. Cartwright's first topic was the electrical power and energy used per employee in the industry. Figures collected by the Iron and Steel Federation suggested that the overall average was about 14,000 kWh/employee/year, but such industry-wide statistics were greatly affected by the amount of steam plant in use. As a result of recently obtained totals for modern works, he suggested that the true energy use might be as high as 47,875 kWh/operative. When energy totals were converted into kWh/ton, rather than per operative, good agreement with United States values was obtained, for a given load factor. In general, however, load factors (mechanical) of steelmaking plant were higher in America.

Control Gear and Motors

Automatic operation of plant was becoming more general in steelworks practice, and as a result the complexity of control gear was growing alarmingly. An example was the loading of a blast furnace, which might be controlled by one man, whose only action was to press a button which initiated the loading of a skip. Some five hundred operations followed automatically before human intervention was again necessary. The complexity which this introduced led to excessive space requirements for control gear, and to counter this there was increasing interest in telephone-type relays.

For motors, the tendency was to group all control gear for a single plant in one room. He was uncertain of the wisdom of this in all cases, and thought that a close study of the economics of the problem was needed. More urgent still was the need for an investigation into the duty cycles of main motors and auxiliaries. It was true that a motor which was too small usually gave trouble and was duly replaced, but no one took any notice of a motor that was too large, although it was wasteful. Often motors of a higher continuous rating than was required had to be used because of difficulties about high starting torque.

Another possible source of economy in steelworks equipment was the use of a.c. instead of d.c. motors. While the a.c. motor might not do the job so well, it could often perform sufficiently well. In connection with control gear generally, there was a growing feeling that too many interlocks were fitted.

In the United States there was a definite tendency to use totally enclosed motors standing in the open, rather than other types placed in a special motor room. For the accommodation of electrical equipment generally, the use of basements was tending to grow, but the cost of civil engineering work incidental to this was proving excessive. Strengthening of floors over basements, which was often necessary, was particularly costly.

Special Difficulties

Mr. Cartwright concluded his lecture with a list of problems which he thought deserved early attention. The first of these was connected with the clearances around switchboards required by the electricity regulations. A smaller, more compact form of switch or contactor seemed to be required, because space requirements were growing alarmingly now that the regulations were being strictly enforced.

Next came wiring methods, a study of which seemed overdue. When relatively simple runs were taking 52 minutes/cable to terminate, it seemed that any machine for speeding up this operation would be worth a big capital investment. It was possible, too, that more attention might be given to the possibility of crimping.

Finally, limit switches and associated devices deserved much closer attention than they received. Too often the motion was not controlled accurately, in some cases because a brake was applied or a current interrupted, and the subsequent overrun of the mechanism was unpredictable.

C

Registration of Contractors

E.T.U. MEMBERS URGE ACTION

THERE was no difference between nationalised industries and private employers in their approach to wages negotiations, declared Mr. Frank Foulkes, president, at the annual policy conference of the Electrical Trades Union, at Eastbourne, on Monday. He advocated a complete new approach to wages problems. The nationalised industries were still operating under capitalistic methods; interest on loans and compensation stock was still the first charge on the industries. In the electricity supply industry this was equivalent to a levy of £143 per year per adult manual worker. He maintained that the interest should be reduced.

Recent pronouncements by Government spokesmen, coupled with experience during the latest wages negotiations in the electricity supply industry, had confirmed his suspicion that the representatives of the nationalised industries on negotiating bodies were allowed to arrive at conclusions only on small matters, domestic to the particular industry. On questions of wages, etc., the union were not negotiating with the body that could arrive at negotiated conclusions, for on such matters the nationalised industries accept advice of Government spokesmen, he went on.

Redundancy

Emphasising that workers' control of nationalised industries was as far, if not farther, away, than it was prior to nationalisation, he spoke of the complete autonomy of the B.E.A. and the area boards over a great number of functions which the workers considered should be subject to negotiation. The latest example was that of redundancy. The London Electricity Board had decided to ignore the principle of negotiation on that question and had the support of the Central Authority, who had made it clear they could not accept that the matter was one for such discussions, he added.

In the session which followed, after approving a resolution opposing the denationalisation of the iron and steel industry, the Conference adopted a proposal calling for immediate legislation by the Government to prevent and restrain any nationalised industry using its funds to conduct and prosecute a campaign against any trade union. (This is a result of the action last autumn when seven recalcitrant members of the E.T.U. won their claim against the union, who allege that the men's action was financed by the London Electricity Board).

Speaking on a resolution opposing habitual overtime, Mr. P. Bentley, of Richmond, said it was no good the Executive fighting for a 5-day week when many people would work the other two days to get more money. A motion was carried expressing concern that owing to rising prices, overtime was becoming more essential to a living wage.

Registration of electrical contractors and installation operatives was one of many subjects for later debate. One resolution, in referring to the dangers of shoddy electrical installation work, suggested that all jobs carried out in buildings and on equipment should in future be sanctioned by the B.E.A. and then only carried out by competent workmen. The conference passed a resolution urging the practical interpretation and legal enforcement of the I.E.E. wiring rules and regulations between electricity boards and electrical contracting associations.

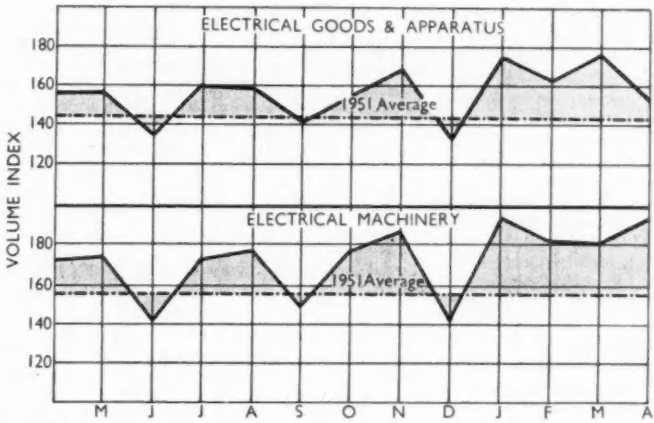
Registration of Wiremen

Another urged the Executive Council to press to obtain compulsory registration of operatives, coupled with greater power, legally backed, for the B.E.A. to enforce a higher standard of installation components.

Although there is no proposal for a wiremen's wage claim at the moment, it is suggested that immediate steps be taken to introduce uniform rates of pay in the whole of the electricity supply and contracting industries throughout the country, based on the London area rates of pay, bearing in mind that the prices of basic commodities are the same throughout the country. A further proposal is for two weeks' holiday with pay in midsummer for all members in the contracting industry.

The annual report of the Union, presented to the conference, refers to the right of the E.T.U. to be the sole representative of employees in contracting departments of Area Boards in negotiations for wages, conditions, etc. The matter has been the subject of further consideration in the E.T.U. There is also news of progress in the establishment of the training college at Esher, which we understand is to be opened in August.

EXPORTS AND IMPORTS



EXPORT VOLUME INDEX

Exports of electrical goods and apparatus, and of electrical machinery maintained their general level in terms of volume during April. In the first category there was a fairly sharp drop of 21 points to 153% of the 1947 level, after correcting for changes in prices that have occurred since that date.

Electrical machinery exports, on the other hand, climbed to the top limit of recent fluctuation, and again reached 194% of the 1947 volume. The total value of electrical machinery exports was £5,263,922, compared with £9,251,351 for electrical goods and apparatus.

EXPORTS of electrical apparatus last month decreased in value by £931,717 compared with the total value for the record month of March last. But it must be remembered that owing to Easter holidays there were only 24 working days in April (instead of the standard 26), while the Australian import restrictions also contributed to the decline. Despite the latter, it will be seen that the value for cooking and heating appliances is above the March total, although the figure for electric irons alone fell from £81,836 to £69,358. Apart from the items listed in our table below, complete electric washing machines valued at £459,663 were exported last month (as against £761,042 in March), together with 1,454 portable electric tools to a total value of £98,404.

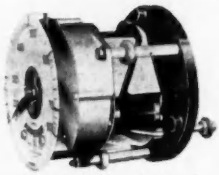
Description	Exports Value Month of April			Imports Value Month of April		
	1950	1951	1952	1950	1951	1952
	£	£	£	£	£	£
Telegraph and Telephone Wires and Cables—						
Submarine	27,144	71,315	4,260	—	—	—
Other	592,553	700,955	645,573	—	—	—
Rubber Insulated	202,180	498,173	791,984	—	—	—
Insulated, other than Rubber	603,349	1,032,634	1,130,762	—	—	—
Wireless Apparatus, including Valves	992,790	1,785,185	1,943,443	128,026	264,711	329,532
Telephone and Telegraph Apparatus	1,411,283	1,151,572	1,369,668	—	—	—
Electric Lighting Appliances, Accessories, Fittings and Parts:—						
Filament Lamp Bulbs	80,572	138,836	148,190	14,692	15,566	14,913
Other Descriptions	284,115	401,674	453,005	14,042	35,486	26,225
Batteries (primary)	98,568	214,102	200,157	—	—	—
Accumulators, Portable	247,361	357,870	335,125	—	—	—
,, Stationary	80,901	71,359	63,425	—	—	—
,, Parts and Accessories	62,644	74,754	98,813	—	—	—
Electrical Cooking and Heating Appliances	215,215	400,484	577,264	—	—	—
Ammeters, Voltmeters, etc., and Parts	101,792	121,007	150,635			
House Service Meters	55,579	141,128	202,175	42,100	33,689	44,091
All Other Instruments	114,367	140,430	103,180			
Electro-Medical Apparatus	34,297	56,619	45,752	—	—	—
X-Ray Apparatus, etc.	62,317	164,206	129,662	54,152	19,993	31,524
Insulating Materials	147,685	210,468	218,474	—	—	—
All Other Articles	378,360	593,938	639,804	110,369	111,267	192,559
Total of Group	5,793,072	8,326,709	9,251,351	363,381	480,712	638,844
Electrical Machinery:—						
Generating Sets (Diesel)* Not exceeding 200 kW	456,708	350,555	514,787			
,, ,, ,, Exceeding 200 kW	101,362	151,088	295,074			
Other Generating Sets	195,809	241,282	92,126	35,137	33,628	62,994
Generators minus Prime Movers, and Parts†	139,885	385,368	616,822			
Motors	622,330	918,765	1,142,335	32,698	37,433	56,550
Convertors, Transformers, Rectifiers, Motor Control Gear, Switchgear, other machinery	1,427,424	2,166,086	2,602,778	11,111	10,195	19,755
Fans, Electrically and Power Driven	107,124	184,431	199,792	—	—	—
Vacuum Cleaners or Electrically Operated Appliances	262,021	459,337	426,229	—	—	—
Total Appliances and Machinery	9,105,735	13,183,621	15,141,294	442,327	561,968	778,143

* 1950 figures include generators minus prime movers. † 1950 figures for parts of generators only.

The BUYER'S *Column*

C.P.'s New Circular Scale Meters

SWITCHBOARD moving-iron ammeters and voltmeters ("C.K.A." pattern) with 4 in. diameter dials and 6½ in. long 240° circular scales are the latest additions to the range of instruments available from CROMPTON PARKINSON LTD., Crompton House, Aldwych, W.C.2. The company has developed this new design to meet the demand for a small compact long-scale instrument, available at a price that compares favourably with that of the short-scale instruments. This has been achieved by concentrating on production of only the popular 4 in. diameter dial, flush mounting pattern, which experience has proved to be generally required because it has the advantage of easy accommodation on switchboards with adequate visibility for normal operations.



Internal structure of the C.K.A. meters

The square front of the instrument, 4 $\frac{5}{16}$ in. in width, is designed to harmonise with metal-clad and other types of switchgear. To meet requests from users of switchgear and other electrical apparatus the case is constructed so that it can be fixed from the front if required. Normal finish is bright black enamel.

The instruments are easy to read without parallax error because the tapered-spear type pointer moves in the same plane as the scale marked on the raised rim of a platform-type dial.

"Thessco" Silver Solders

BRAZING in earlier days was by no means the task for the tyro and, indeed, many experienced men in industry were not too happy about the process. Probably this was due to the fact that in general only copper-zinc alloys were available. These had a relatively high melting range.

New developments, however, have brought about the introduction of alloys with a lower melting range (round about 600° C). These alloys are known as silver solder or low temperature brazing alloys.

These alloys of silver, copper, zinc and often cadmium because of their high strength and fluid penetration coupled with low melting range enable both the brazing time and quantity of solder used to be considerably reduced. Very strong joints are achieved which are thin, neat and require little cleaning.

Joining with silver solders can be made by many methods—torch, furnace, electric resistance, salt bath, dip and h.f. brazing.

A brochure recently issued by the SHEFFIELD SMELTING CO. LTD., Royds Mill Street, Sheffield 4, draws attention to the range of silver solders which the firm supply. These are supplied in sheet, foil, strip (coil, or straight lengths), rod, wire, rings, pellets, discs, washers, wire shapes, filings or powder. The brochure also draws attention to the company's research and technical departments which are always ready to offer advice on soldering problems. Indeed, a team of experienced representatives is available to visit and help users by practical demonstrations and discussions. Naturally the company also supplies suitable fluxes.

The "Syphonit" will empty your washer

THE problem of emptying washboilers and washing machines is rendered more easy by the use of a useful device introduced recently by LABOUR SAVING APPLIANCES, 5 & 7 Chester Street, Manchester 1.

It comprises, basically, three lengths of flexible waterproof hose coupled together "star" fashion by a special connection block, together with tap attachments and end bindings. Principle is simple. One "arm" is connected to the main water supply tap, one is inserted in the washboiler and the third directed into the sink drain hole. When the water tap is turned on the rush of water causes the syphon effect to empty the tub.

Scemco introduce Diffuser Fittings

NEW production by SCEMCO LTD., Soho Street, London W.1, is a louvred diffuser for attachment to the angled "Windolux" fluorescent fitting.

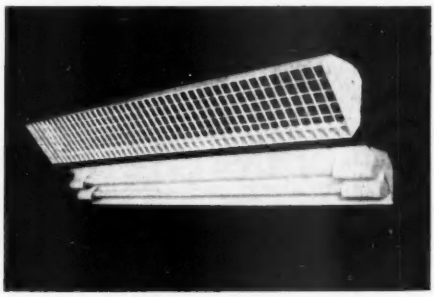
Available with 1½ in. or 3 in. squares and with an angle sided design the company consider this an important contribution to the achievement of efficient window lighting.

Retail price is £4 17s. 6d for the 5 ft twin fitting or £4 12s 6d for the 4 ft fitting.

The "Forfex" Hairdryer

THE range of hairdressing equipment marketed under the trade name "Forfex" by JOHN A. FRANSEN LTD., Ryefield Crescent, Northwood

The louvred diffuser for Scemco's Windolux fitting



Hills, has now been enriched by the addition of an attractively designed hairdryer powered by an a.c./d.c. 200/250 V series wound motor, operating at 15,000 r.p.m. in self-lubricating bearings.

The dryer, economical in use, embodies many important factors. Featherweight is due to use of plastics and properly studied and designed balance lessening fatigue. The air output of 600 litres per minute at the nozzle makes drying a faster business. Speed of the air with nozzle, 27 metres per second—without nozzle, 15 metres per second.

Four-temperature control is fitted — room temperature, 138° F, 271° F and 361° F. The horizontal airflow, a new feature, ensures maximum efficiency at the lowest operating cost. Vibration is negligible because the power unit is mounted in the all-insulated case between rubber shock absorbers.

Available in maroon or dark red the price to the hairdressing trade is £6 12s. 3d. plus 44s. 1d. p.t. The price to the general public is £8 5s. 4d. plus p.t. 44s. 1d.

This is the stylish "Forfex" hairdryer. It incorporates heat control

Relay for Photo-Electric Amplifiers

A UNIT for use with the company's type MD photocell amplifier, to prevent incorrect indication due to the failure of the lamp or interruption and re-connection of the electric supply due to external faults, has been announced by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, W.C.2. The unit, however, has other applications where it is desired to safeguard equipment against mains or other kinds of circuit failure.

In photocell applications, failure of the lamp obviously produces the same effect as interrupting the light beam, and in the case of protective systems gives rise to an objectionable false alarm. The same effect is produced if the electric supply is cut off and re-connected within a period of 8 seconds. For such a period the cathode of the valve remains hot, and immediately the supply is re-connected the anode current is re-established before the lamp is fully alight and a momentary contact of the valve relay occurs and operates the alarm.

The new relay is a current-operated device and is excited as long as the photocell lamp is intact. If either of the events previously mentioned occurs, this relay releases and brings in circuit a pilot indicator lamp. As the relay has a lock-out contact, it can then only be reset by means of a manual push-button provided for this purpose. The pilot lamp indicates that the system has been disconnected and is out of action.

The Castra Washing Machine

AN inexpensive junior model electric washing machine is now being produced by the CASTRA ELECTRIC WASHING MACHINE CO. LTD., Castra Works, Rodley, Leeds.

The model is said to be economical in use both of electricity and the soap or other detergent used. Finished in cream enamel the whole machine is 16 in. wide and 29 in. high, thus after stowing away the wringer it will fit under the average draining board.

The agitator which is removable for cleaning and drying is designed not to damage fragile fabrics in any way. It copes with the 4½ lb load in about ten minutes when the wash is ready for rinsing, whilst the rubber rollered wringer is said to handle easily a full-size blanket.

TRADE PUBLICATIONS

CAPACITORS.—Capacitors for radio, television and electronic equipment of the paper-dielectric range by B.I.C.C. are described in Publication No. 313, recently issued by British Insulated Callenders Cables Ltd., Norfolk House, Norfolk Street, London, W.C.2.

CARTON STITCHING M/CS.—A leaflet issued by the Lawton Supply Co., Ltd., 80 Whitechapel, Liverpool 1, describes a range of pedal-operated carton stitching machines which the company has recently put on the market.

LIGHTING.—Leaflet D.10 issued by Linolite Ltd., 118 Baker Street, W.1, describes the complete range of Linolite fittings and gives prices, including purchase tax.

ACCUMULATORS.—Latest brochure published by Venner Accumulators Ltd., Kingston By-pass, New Malden, Surrey, tells the story of the company's latest ultra lightweight silver-zinc accumulator and the numerous uses to which it can be put.

FURNACES.—Horizontal hatch type electric furnaces are featured in a brochure recently received from the General Electric Co. Ltd., Magnet House, Kingsway, W.C.2.

CAPSTAN LATHES.—Entitled "The Customer is Always Right," the new booklet published by Murad Developments Ltd., Stocklake, Aylesbury, Bucks, sets out to give overseas customers, principally in North, Central and South America, and prospective customers an idea of the organisation behind machine tools which are produced by the company.

RECTIFIERS.—Two recent issues from Standard Telephones and Cables Ltd., Connaught House, Aldwych, W.C.2, are Bulletin F/SRT6 on Sentercel single and 3-phase medium current rectifiers and Leaflet F/SRL8 on low-tension rectifiers.

The WEEK in NEWS

Institute of Material Handling Formed

Founder Members are mainly Users not Manufacturers

WITH the third Mechanical Handling Exhibition due to open at Olympia next week, it is most appropriate that an announcement has been made concerning the formation of an Institute of Material Handling. A number of attempts were made to this end after the war with little result, but the success of the first exhibition and convention in 1948 brought the matter well to the fore once again. Now another attempt has been made and a meeting convened. About 70 persons, representatives of manufacturers and users of the type of equipment involved, attended, though the former were in a very small minority. A vote was taken on the formation of the Institute and was carried unanimously.

The chairman of the meeting, Mr. John R. Sharp, stressed that the meeting was called for by users and not manufacturers. Just over 100 invitations were sent out and all but two of those unable to be present expressed keenness in the proposition. It was felt, he said, that Material Handling should have a status of its own; that interested persons should be able to discuss problems; and that all forms of technique should be reviewed. The Institute would not be formed for trade or business objects, and there would be various classes of membership. A number present pointed out that they were not engineers, but were concerned with the best method of moving materials.

It was decided that membership will be confined to individuals and not include firms or corporations. All persons who wanted to further the technique of material handling would be eligible. The decision to form the Institute having been taken, Mr. H. P. Mott, of Vauxhall Motors, was appointed chairman, and Mr. J. Bright, Joseph Lucas, deputy chairman, and Mr. A. F. Much of I.C.I., treasurer. The secretary is Mr. M. W. Paynter, 20-21 Took's Court, Cursitor Street, London, E.C.4.

Raw Materials Fall in Price

THE Government has decided that the selling prices of metals and other commodities, under the responsibility of the Ministry of Materials, shall be as near as possible to what would be the free market price, irrespective of the prices at which they have been bought. Prices will in future be based on replacement costs and U.K. manufacturers will be able to obtain supplies at world prices. Reductions in the prices of lead and zinc have just been announced (see page 1012) and other price reductions are likely to follow. Any loss on future transactions will have to be covered by a supplementary estimate.

Evidence on North Wales Hydro Scheme

THE chairman of the Merseyside and N. Wales Electricity Board, Mr. J. Eccles, gave his views on the proposed N. Wales Hydro-Electric scheme to the House of Commons Select Committee considering the matter last week. Should the Bill be passed it is probable that a further 35 million units of electricity will be made available in the area.

Mr. Eccles said it would be practicable to supply Merioneth and Caernarvon with electricity during the next five years at the expense of other areas but it would not be right to give priority to those two counties, nor was there any justification in taking such an action. The scheme was to benefit the whole of N. Wales and not just the particular areas where the works happened to be. He had been questioned by the representative of the two county councils.

Asked what advantages had already accrued as a result of development, Mr. Eccles said that in West Wales on vesting day charges were between 6d. and 1s. a unit. Now the maximum would be 4½d.

The First Half-Century

The electric light has no peer for use in churches and public buildings, and it is therefore remarkable that many of our most famous buildings have for so long neglected this beautiful illuminant. Our premier church—St. Paul's Cathedral—had long been under the impression that the gas age was still with us, and it was only when Mr. Pierpont Morgan offered to give £10,000 towards the installation of electric light throughout the cathedral that it was realised that a more cleanly and suitable illuminant than gas had long been available for church lighting. When Sir Christopher Wren designed St. Paul's he unfortunately omitted to make provision for wiring the building. The main piers supporting the porticos were, however, left with a small hollow shaft running down the centre, and in these rainwater pipes are fixed. The shafts have now been used to carry the cables, holes being bored in the thick masonry to enable the leads to enter and leave the piers.—*From our issue of May* 29, 1902.

Electricity Means more Efficient Industry

THE case for electricity was put before E. Anglian members of the electrical industry recently by Mr. C. T. Melling, chairman of the Eastern Electricity Board, when he spoke at the inaugural dinner of the Norfolk Electrical Social Committee. Mentioning the problems confronting the industry at present, he said there were two main points involved, one that the customer should be free to choose his fuel, and the other that British industry would be more efficient if run on electricity.

Mr. Melling said it had been suggested that the way to solve our fuel problems and overcome the coal shortage was to stop using coal for electricity. He admitted there was a scandalous waste of fuel, but the more that was used for electricity, the more efficient industry would become. There were many who by using electricity would save fuel and increase efficiency. Referring to increased capacity and lessening of power cuts, he said the position was being reached where electricity could be used with confidence.

The Norfolk Social Committee represents the E.C.A., E.D.A., and Eastern Electricity Board, and was formed to combine the social events of electricians in the county.

Clergy Join Dispute on Commercial Premises

REFERENCE has already been made in these columns in the past to the dispute in the Midlands over charges for electricity made in respect of charitable (religious or otherwise) institutions. The main contention is that those premises should not be classed as commercial and charged appropriately. The latest figure in the critics' ranks is the Bishop of Lichfield. He has described the new charges as monstrous and asked for a fair price. The Bishop has been supported by the Archdeacon of Stoke, who stated that in some homes the charges had increased by 100%. He said he failed to see why such institutions should be regarded as commercial.

The Midlands Electricity Board has explained that there was a method of charging for private residences, farms and industry, and all other premises, which happened to include commercial premises and churches. They were quite correct under the Act in charging this price. There were some anomalies which were being dealt with, and special consideration was being given to welfare homes.

FILM FOR STUDENTS ON COMBUSTION

AN admirable film depicting the advances made during recent years in combustion practice as applied to steam generation has been completed by International Combustion, Ltd. The film, which is suitably entitled "Combustion," is most topical, as one of its aims is to promote the economical use of coal as fuel. Produced for the company by G. B. Instructional, Ltd., it is intended primarily for students at universities and technical colleges and young engineers.

Briefly, "Combustion" traces the story of coal through the ages, and illustrates the development of combustion. Modern progress is depicted by mechanical stokers, and in introducing the principles of pulverised fuel firing shows its application to water tube boilers and power station practice.

MINING ENGINEERS IN SOUTH-WEST AMALGAMATE

NEGOTIATIONS for the merging of the South Western Society of Mining Engineers with the South Wales Institute of Engineers have now been completed, it was announced last weekend. The amalgamation is due to take effect as from July 1 next, and at the same time the Institute will be affiliated to the Institution of Mining Engineers.

The South Western Society of Mining Engineers, which was formed in 1947, will cease to exist as such from that date and its members will become members of the South Wales Institute. The latter is believed to be one of the oldest in the country, having been formed in 1857. It was granted a Royal Charter of Incorporation in 1881. It has been apparent for a number of years now that the merger of the two bodies would be an advantageous step, and the recently completed arrangements have been going on for some months.

The third Institution involved, that of Mining Engineers, was established in 1889 and was incorporated by Royal Charter in 1915. It was founded as a Federation of District Institutes, its objects being the advancement of coal and iron ore mining and allied industries and the promotion of knowledge for the control and direction of mining operations. There are at present eight separate Institutes federated with the Institution.

E.D.A.'s stand at the recent Chelsea Flower Show. Features of the display were the methods shown of producing early crops by electric soil-warming and the use of electric light to extend normal daylight

Midlands want Electrical Exhibition

FOLLOWING our report last week on prospects for next year's B.I.F., we learn that some Midland manufacturers are pressing for a more representative exhibition at Castle Bromwich and greater powers over what shall be shown. An attempt is being made to bring about some changes in presentation before the 1953 Fair. Suggestions have been made for improvements and increasing the scope of that section of the exhibition. It is understood that one proposal is to the effect that the Fair should remain an annual event but that certain industries should take it in turns to show at Castle Bromwich. One year machine tools could be the theme and the next large firms which exhibit mainly for prestige purposes could take part. It was also thought that some firms showing in London ought to be at Castle Bromwich.

A representative of a Birmingham electrical company is understood to have commented that electrical firms in the Midlands have been campaigning for an exhibition of their own. Efforts to that end had so far proved fruitless. Some electrical manufacturers had withdrawn from the B.I.F. because they were surrounded by all kinds of other equipment, it has been alleged.

Exhibits at Toronto Trade Fair

THE Canadian International Trade Fair opens at Toronto on Monday next and continues until the following Saturday week. It is understood that over a third of the exhibition has been devoted to engineering, machinery and plant equipment, and that that section will include prominent manufacturers from this country, Canada and the U.S., as well as one firm each from Sweden and Switzerland.

Among British exhibitors will be members of the Brush A.B.O.E. Group. Petters Ltd. are to show a range of petrol, TVO and diesel engines. The stand of H. Widdop and Co. Ltd. will include their EMB6 marine pressure-charged Diesel engine.

Probably the most outstanding exhibit on the G.E.C.'s stand will be the "Toxolex" transformer made by the Bushing Co., Ltd.

OFFICIAL PUBLICATIONS

HEATING APPLIANCES (FIRE GUARDS) BILL.
Report of proceedings of Standing Committee B. H.M.S.O. 9d.

HEATING APPLIANCES (FIRE GUARDS) BILL.
As amended by Standing Committee B. H.M.S.O. 3d.

UNITS AND STANDARDS OF MEASUREMENT. Employed by N.P.L. 3. Electricity. H.M.S.O. 9d.

JUDGE QUASHES BOARD'S CONVICTION

LAST week the Queen's Bench Division quashed the conviction of the N.E. Electricity Board which followed a fatal accident to one of their workmen at the Stoneycut substation, Dalton-le-Dale. The Board had been found guilty at Seaham (Durham) of a breach of the Factories Act and Electricity Regulations. Mr. Justice Devlin, allowing the Board's appeal, with costs, said it was clear that the employee's action was inexplicable and no offence had been committed.

Lighting in Reconstructed Hotel

LAST month an £82,000 rebuilding scheme was completed at the Golden Lion Hotel, Stirling, which has transformed the premises into one of the most modern and luxurious establishments in Scotland. The reconstruction work was made necessary following a disastrous fire which destroyed much of the building nearly three years ago. As may be expected, the opportunity was taken to install a new lighting scheme and fittings for this were supplied by the Edison Swan Electric Co., Ltd.

Illumination of the hotel's foyer (illustrated left) is provided by special decorative architectural features. Each of these comprises a plaster flare above a Harcourt fixture, glazed with a sand-blasted dish, relieved with a clear line, and sand-blasted festival-pattern glass disc, and double bent panels. The dish measures 3 ft. in diameter.

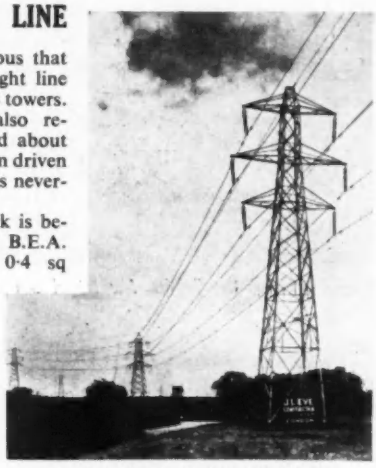
Each of the bedrooms contains a bedside cabinet, fitted with a swivel-type pedestal lighting fitting. The pedestals swivel from the rear edge of the cupboard. Lighting in the ballroom includes 14 three-light Harcourt brackets mounted on mirrored panels, and hinged soffit fittings for mounting on the ceiling.

The foyer of the reconstructed Golden Lion Hotel, Stirling, showing the architectural lighting fittings

OBSTACLES TO 132 kV TRANSMISSION LINE

REMARKABLE problems are being encountered in the planning and construction of the new 132 kV line from Brunswick wharf (Poplar) to Brimsdown (Enfield), which was designed by J. L. Eve Construction Co., as it runs through particularly difficult suburban terrain. The route follows the valley of the River Lea, where the many obstacles —houses, factories, railways, canals, reservoirs and sewers— make the line so tortuous that there are only six straight line positions in a total of 74 towers. The marshy ground also required much piling, and about 6,000 ft of piles have been driven so far. Good progress is nevertheless being made.

The construction work is being supervised by the B.E.A. and is designed for 0·4 sq in. conductors. J. L. Eve, incidentally, are also the main contractors for this scheme. Our accompanying illustration shows the line passing through the Metropolitan Water Board's property at Walthamstow.



Part of the Poplar-Enfield 132 kV line

RADIO CLUB COMES OF AGE

THE twenty-first birthday of the Radio Industries Club was celebrated in London last week. Among the 500 or more members present with their guests were many belonging to the original committee which formed the club in 1931. Prior to the luncheon, the annual meeting was held and Lord Brabazon elected to succeed Sir Ian Fraser as president for 1952-53. Mr. Owen Pawsey was later elected chairman of the new committee.

Points from the annual report are that membership has now reached 750, including an increase of 31 during the year under review; assets of the club now exceed £2,000; and a total of £457 was given to the benevolent fund.

Drive for Abolition of Purchase Tax

IT was essential that organisations should continue to press for the abolition of purchase tax on articles which could be called necessities of life, said Major Guy Lloyd, in his presidential address to the conference of the British Council of Retail Distributors last week. He said he wished it were possible to do away with the tax. Many of the appeals for relief from taxation were likely to have an effect, Major Lloyd asserted. Already some concessions had been promised and more had been hinted at during the past few weeks, he said.

TALKS ON GOLD COAST H.E. SCHEME THIS WEEK

THE Volta River scheme, proposing the establishment of a large hydro-electric plant for the production of aluminium from the Gold Coast bauxite, moves a further step nearer fruition this week. Talks are taking place in London this week between the Gold Coast Minister of Finance, Mr. R. P. Armitage, and the Minister of Commerce and Industry, Mr. K. A. Gbedemah, and representatives of the U.K. Government, Aluminium Ltd. of Canada, and the British Aluminium Co. Ltd., and early next month the English and Canadian officials and representatives will go out to the Gold Coast for further discussions. The Colonial Secretary, too, Mr. Oliver Lyttelton, left London last week-end for a brief tour of West Africa to get closer knowledge of the various projects contemplated. The Volta River scheme envisages the utilisation of that river, with a hydro-electric plant of about 580 MW, for the production of 210,000 tons of aluminium annually. The reserves of bauxite locally are estimated at 225 million tons.

E.A.W. Leaflet on Fuel Situation

THE E.A.W. has produced a small leaflet setting out in question and answer form, numerous matters relating to the current fuel situation. It was prepared in response to requests from members all over the country and was distributed to delegates at the Association's annual conference last week.

Full Explanation in B.I.C.C. Report

ALTHOUGH the company meeting and financial affairs of British Insulated Callenders' Cables Ltd. are reported elsewhere in this issue, we cannot let the occasion pass without reference to the admirable brochure in which all the information has been published. Produced by the company for distribution among shareholders, the balance sheet and statement by the chairman, have been accommodated with, and largely explained by, illustrations of activities and events within the company. A map of the U.K. shows the situation of offices and works at home and full details are also given of branches and depots throughout the world. The whole has been enclosed in an attractive cover of varnished board.

View of the floodlit Municipal Building in Singapore

Singapore Building Lit by Discharge Lamps

BEFORE the war the Municipal Building in Singapore was the centre of a most effective floodlighting scheme, but the total loading of some 20,000 W was deemed prohibitive in view of postwar power restrictions. A new scheme has therefore been devised which comprises G.E.C. luminous discharge units which have a load of about 7,000 W only. The effect of the new installation is shown in our accompanying illustration.

For the end panels of the facade a 400 W mercury lamp was used in an old F5726 floodlight. Each of the columns has been accentuated by a 125 W mercury lamp housed in a specially adapted F5706 unit. They were placed in brackets at the base of columns and succeeded in illuminating the whole structure from plinth to cap. An unusual feature was the placing of red neon lamp floodlights behind the columns so that they were silhouetted against an orange-red glow which also provided a contrast with the mercury lighting. A theatre spotlight on a street lantern tower provided highlighting for central feature at the top of the facade, and for the lower parts a "Uniway" street lighting unit fitted with 125 W mercury lamps, was specially adapted.

NEWS IN BRIEF

Members of Marconi Veterans Association, numbering about 140, gathered at Caxton Hall on Saturday for their 16th reunion and annual meeting. Total membership of the association now stands at 1,485, of which 330 were retired, it was stated.

E.D.A. film "Electric Water Heating" was screened for British Electrical Group last week. The audience included local contractors, members of the Corporation staff and the sales staff of the S.W. Electricity Board.

Complete list of exhibitors, as at March 17, at the International Machine Tool Exhibition this year has just been issued by the Machine Tool Trades Association. The exhibition is to take place between September 17 and October 4.

The Society for the Propagation of the Gospel has accepted Marconi's offer to provide one of its "Seamew" radiotelephone transmitter-receivers for use in Society's ship *Centurion* during her tour of British ports.

The large new factory at Gorseinon, Glam., of the Minnesota Mining and Manufacturing Co., Ltd., was officially opened by Mr. P. Thorneycroft, President of the Board of Trade, last Saturday.

Discussions on the trading arrangements for the year 1952, in accordance with the Anglo-Yugoslav Trade Agreement 1949, have just been concluded in London. These arrangements provide for the import into the U.K. of non-ferrous metals, miscellaneous goods and food. Exports to Yugoslavia include mining, agricultural, electrical and other types of machinery.

Hull and E. Riding branch of E.A.W. celebrated its 21st birthday recently.

Judging from the fact that Ipswich Industrial Co-operative Society now employs 101 electric vehicles, this mode of transport appears to have found favour. Latest additions to the fleet are two such vehicles for delivering coal and after an experimental period embracing all weathers the venture has proved successful. One of the two 3-ton Morrison "Electricars" powered by 40-cell Exide-Ironclad batteries with a capacity of 315 Ah is illustrated here

Questions in Parliament . . .

British Trade in U.S.

The President of the Board of Trade was asked last week if he would make representations to the U.S. Government that Britain would prefer to earn dollars by normal trading and that modifications in the Buy American Act and tariff regulations would be helpful. In reply, it was stated that in view of the declared position of the U.S. Government, such representations were not considered necessary.

Census of Production Forms

Mr. H. Strauss gave some information in a written answer concerning the selection of recipients of Census of Production forms in 1951. They were sent, he stated, to all undertakings included in the Census of Production register which was based on information supplied by the Ministries of Labour, Fuel and Power, and Works.

Report on Lamp Industry

The Minister of Supply was asked on Monday what time limit had been agreed with the E.L.M.A. for bringing into effect the full implementation of agreed proposals arising from the report of the Monopolies Commission on the electric lamp industry. Mr. Sandys stated in a written answer that E.L.M.A. had given an undertaking that all necessary changes in their sales and methods will be brought into effect not later than July 1.

Power Stations

Questions were asked last week concerning the output capacity of generating plant and the coal consumption in power stations. Firstly, Sir A. Gridley asked the total generating plant capacity available in the aggregate in all power stations on December 31 last. Replying, the Minister of Fuel and Power said output capacity was 14,147,000 kW for the period stated. He added that he had authorised under the capital investments programme the bringing into operation of 1,250,000 kW of new plant during 1952.

As regards the second question put by Mr. G. Nabarro, the Minister stated that during the year ended April 30, 1952, coal consumed in power stations amounted to 34·1 million tons.

Later in the week, Mr. Nabarro also asked the Minister by what amount coal consumption during 1952 would exceed earlier years, and the annual aggregate increase for each year to 1960. Consumption this year, Mr. Lloyd said, was expected to amount to between 34 and 35 million tons. Concerning future years, it was not possible to make any forecasts, he said.

Asked about research into equipment for burning large accumulations of pitmound, Mr. Lloyd said advice had been given on the design of plant to burn coal of a high ash content. Work is proceeding and if successful, the possibility of the economic use of material in existing pitmounds could be examined.

Sales Promotion

The Minister of Fuel and Power stated in a written answer on Thursday that the nationalised industries have been asked to avoid purely promotional advertising and to confine publicity to informative and educational matter. All three fuel and power industries had accepted those principles subject to the settlement of detailed points. Concerning an advertisement of the Midlands Electricity Board asking householders to save winter coal by using electric space heaters, Mr. Lloyd said the matter was being discussed with the Board.

Heating Appliances

Last week the Heating Appliances (Fireguards) Bill passed through its committee stage in the House of Commons, and after some minor amendments, was reported. The Bill has the intention of prohibiting the sale of unguarded electric fires, gas fires or oil heaters. In the first of the amendments agreed to by the committee, letting under a hire purchase agreement and simple hire were added to selling as actions to which the Bill, if it becomes an Act, would apply. Clauses were added to protect, amongst others, hire-purchase companies concerned only with finance, and not directly handling the appliances at all. This point occasioned some debate before agreement was reached.

A proposed amendment that would have extended the provisions of the Bill to certain cooking appliances was strongly opposed, although the proposing Member pressed it strongly. In reply to questions arising out of this point, the Joint Under-Secretary for State for the Home Department assured the committee that comprehensive regulations would be made if the Bill became an Act, covering all the types of appliance mentioned in it. It was the intention of the Home Office to take all appropriate action to see that the Bill was made thoroughly effective.

Uncollected Goods

Although it was almost entirely rewritten in the process, the Disposal of Uncollected Goods Bill had a comparatively easy passage through its committee stage in the House of Commons. The rewriting occurred because it was necessary to translate the original wording into precise legal language, and the substance of the Bill was hardly altered from its state as introduced. With certain safeguards goods, accepted for repair or other treatment, may be sold under the provisions of the Bill twelve months after they have been ready for return to the customer. The safeguards are complicated, and there was some indication that some matters might be raised further at the report stage.

Electric Supply News . . .

Bridgend

A breakdown in the 33 kV underground cable supplying the Bridgend Trading Estate, last Thursday, caused a stoppage of work in the area. This is the third breakdown in the line—the only one supplying the estate—in the past six months. Employees of the South Wales Electricity Board worked hurriedly to establish the fault over 4,400 yards of the cable stretching from the Litchard substation to the trading estate. Supplies were not resumed till Monday, we learn. Board officials agree that a duplicate supply line should be provided, but restriction on capital expenditure has prevented any action to date. The town of Bridgend itself was also without supplies for a short time last Saturday, as the result of an explosion at a switching station.

Consett (Co. Durham)

Criticism of the electricity network owned by the National Coal Board was expressed at a meeting of the Urban Council when it was reported that the network would not be able to cope with the load of 17 street lamps proposed at Leadgate. It was pointed out that it was no use blaming the Coal Board who had inherited the network from the former colliery owners. The network had originally been able to cope with demands but with the introduction of additional appliances the system became overloaded. To bring the system up to date would cost a considerable sum in County Durham alone. It has already been announced that the Electricity Board will take over these networks and eventually improve the system.

Dartmouth

Engineers of the South Western Electricity Board last week completed one of their biggest and most complicated crossings when they spanned the River Dart with a 33 kV submarine cable, a distance of 1,587 ft. The cable was laid about 100 yards due west of Blackness Rock, on the south bank of the Dart, to Pinhoe Point on the north bank. A difficult cross-current made it too hazardous to attempt floating the cable across on drums. Instead, a shallow draught pontoon type of barge was reinforced with timber and converted to carry the drum and cable. The new line has become necessary to meet the power demand in the Dartmouth district. Considerable development in the Kingsbridge area has also brought about the need for increased capacity main transmission lines.

Morpeth

A deputation from the Town Council has visited the North-Eastern Electricity Board to discuss the speeding up of the scheme for converting 422 pre-war houses from gas to electric lighting. The decision to make the change-over was made two years ago, but after a number of houses were dealt with, the work stopped. Some houses have been wired but not connected to the supply. The Board is to expedite the work, and the Council is to co-operate by not insisting on underground cables in certain streets, which would delay the scheme.

Newquay

Hoteliers in this Cornish seaside resort are now complaining of the new tariff of the South Western Electricity Board. It is stated that some are discarding up to 50% of their electrical equipment in order to reduce their assessments.

South Western

During the past year the South Western Electricity Board connected more farms than in any previous year, it is stated. The total for 1951-52 was 1,174 compared with 911 in the preceding year.

Wigton

The Rural Council is to receive a deputation from the Northern Gas Board soon to hear their plea for "freedom of choice" for tenants—a choice to use either gas or electricity for cooking and clothes-washing purposes in their homes. So far the Council has adopted the 50-50 system of installing electricity in half the new houses and gas in the others.

LIGHTING SCHEMES

Aberdeen.—The Watching and Lighting Committee has approved a scheme for improved lighting in Crown Street, at an estimated cost of £2,386. A section will have fluorescent lamps and the remainder mercury discharge lighting.

Berwick.—The borough surveyor is to report on the possibility of improving the lighting between Golden Square and the Town Hall.

Bexley (Kent).—Borough engineer is preparing a scheme for lighting Faygate and Hurst Place housing estates. The first named is to have filament lights and the latter, sodium discharge.

Blackburn.—T.C. is recommended to approve schemes for improved lighting in part of Lambeth Street, Hollin Bridge Street, Hamilton Street, Aqueduct Road and East Park Road, at a cost of £2,875.

Newcastle-on-Tyne.—T.C. to erect a further 34 electric street lights at Longbenton housing estate, at a cost of £868.

Seaham.—The North-Eastern Electricity Board has informed the Urban Council that improvements are needed to the local street lighting system and the cost would be £2,556. The matter is under consideration.

Southall.—T.C. to submit to M.o.T. for approval schemes for improved lighting in Margaret Road and Havelock Road.

Company Activities . . .

Aberdare Electric

Profit, before taxation for the year to March 31 last is £40,161 (*£24,371*). The Ordinary dividend is 8%.

British Insulated Callender's Cables Ltd.

Production during 1951 has increased overall by 5%, compared with the previous year, stated Sir Alexander Roger, the chairman, at this meeting last week. For the last quarter of 1951, it was 15% above the 1950 level. Direct exports at £17 million were slightly lower than the previous year, owing to the shortage of steel and the prohibition of exports of copper in certain forms. He also referred to an outstanding order from Queensland, Australia, for 1,000 miles of transmission and distribution lines, and an order for electrification of 236 single-track miles of railway lines out of Sydney, N.S.W. From North America had been obtained a valuable order for 1¼ million yards of screened quad and aluminium-sheathed co-axial cables. In consequence of the shortage of copper, considerable technical effort had been devoted to the possible uses of aluminium in certain processes, with marked success. Longer term research on methods of extruding aluminium in ways suitable for cable making are in progress with encouraging results, he added.

British Thermostat Co.

Group net profit for the year to January 31 last is £116,953 compared with £126,479 for the previous year. The final Ordinary dividend is 22½%, again making 30% for the year. The net profit figure is struck after deducting £174,173 (*£176,562*) for taxation, £52,548 (*£35,020*) for depreciation and £91 (*nil*) attributable to outside interests. There is added £27,786 (*£4,887*) taxation no longer required, and £110,000 (*£80,000*) is placed to general reserve, leaving £273,955 (*£265,201*) carried forward.

Sydney S. Bird & Sons

Group profit for 1951 is £20,121 (*£13,414*), after charging taxation of £34,400 (*£15,450*). This dividend is 15% (*same*), plus bonus 5% (*nil*).

Enfield Cable Works Ltd.

The considerable drop in trading profit—from £437,270 in 1950 to £179,899 for 1951—attributed by the chairman to the rising price of copper and a decrease in supplies, is further explained in the statement with the full accounts. The chairman states that since rationing of copper in January, 1951, the company tried to book only those orders which have a relatively low copper content. But that procedure also meant that their substantial business in bare copper wires and bare stranded copper has had to be largely abandoned. Sales of bare copper wires and strands in 1951, on a tonnage basis, amounted to only 44% of the corresponding sales for each of the two years 1948 and 1949, he adds. The full accounts show that after deducting depreciation, taxation, etc., the net profit for 1951 is £2,216 (*£186,260*). No allocations are made to general or contingencies reserves, which a year ago received £16,961 and £50,000 respectively.

Harland Engineering Co.

Group trading profit for 1951 is £196,383 (*£207,543*), plus £7,439 (*£133,927*) other income. Depreciation absorbs £31,813 (*£30,239*) and taxation £96,921 (*£122,348*), leaving a net profit of £65,955 (*£74,267*). The sum of £13,750 (*£18,000*) is placed to plant replacement reserve, £20,000 (*same*) to general reserve, and £4,000 (*£2,000*) to pensions reserve, and after payment of dividends, including Ordinary of 10%, there is £37,528 (*£31,980*) carried forward.

Heatrae Ltd.

Net profit for the year ended February 29, is £15,737 (*£9,415*) after charging taxation of £18,000 (*£5,000*). The Ordinary dividend is again 12½%; and there is £21,530 (*£15,555*) carried forward.

Telephone Manufacturing Co.

The group profit for 1951 is £111,405 (*£108,917*), after charging taxation of £174,571 (*£128,998*) and crediting revision of prices on earlier contracts £32,950 (*nil*). The final dividend is 7½% again making 10%.

Venner Ltd.

An increase of £22,623 in the net profit for 1951, before taxation, compared with the 1950 figure, is shown in the preliminary statement. The net profit, before taxation, is £66,694 (*£44,071*). Taxation absorbs £33,369. The dividend too is raised from 12½% in 1950 to 15% for 1951. The sum of £15,000 is placed to general reserve and there is £14,102 (*£14,077*) carried forward.

Westinghouse Brake and Signal Co.

On the need to raise more capital the Board states that it is clear that the matter will have to be dealt with before very long, but a public issue, involving the consent and collaboration of the appropriate authorities and outside interests, would of necessity take time. The directors therefore ask for a temporary increase in borrowing powers from one and a half to twice the issued capital.

Dividends Declared

Atlas Electric and General Trust.—Dividend of 5% (*4%*).

Crompton Parkinson.—Ordinary interim of 3¾% (*same*), payable on June 30.

Dewhurst and Partner.—Interim of 4% (*10%*) on trebled capital.

Commercial Information

CONTRACTS OPEN

HOME

June 3.—Hull. Electrical work in 34 dwellings at New George St. and Sykes St. A. Rankins, City Architect, Guildhall. Deposit £1 1s.

June 3.—Sunderland T.C. Electrical installation at Memorial Homes for aged on Hill View estate. Borough Architect, Grange House, Stockton Rd. Deposit £2 2s.

June 4.—Dublin. Electrical installation in part of Grangegorman Mental Hospital. Varming and Mulechy, Consulting Engineers, 62 Merrion Sq. South. Deposit £5 5s.

June 4.—Eston (Yorks) U.D.C. Electrical equipment for 200 houses. N. C. Harrison Surveyor, Normanby Rd., South Bank-on-Tees.

June 4.—Lancashire. Electrical installation at Worsley Mount Ship, Leigh Nel Pan, Middleton Bow Lee and Urmston Highfield primary schools. County Architect, County Hall, Preston.

June 4.—Newmarket U.D.C. Supply and erection of (*a*) 11 concrete columns with lanterns and 400 W h.p.m.v. lamps and other equipment for Group A street lighting in Exning Rd.; and (*b*) 48 concrete columns with lanterns and 150 W tungsten lamps and auxiliary equipment for Group B lighting in Rous Rd., Vicarage Rd., Park Lane, Queen St., The Severals and Houldsworth Valley estate. F. B. Waterfall, Engineer and Surveyor, Severals House, Bury Rd.

June 4.—Poulton-le-Fylde (Lancs) U.D.C. Electrical work in 60 houses and 24 flats on Carr Head estate. Fairbrother, Hall and Hedges, Architects, Barclays Bank Chambers, Birley St., Blackpool.

June 5.—Belfast. Alterations to electrical installation at Edenderry intermediate school, Glenwood intermediate school and Park Parade intermediate school. Education Architect, Academy St., Belfast.

June 5.—Monaghan. Complete electrical installation in Divs. 3 and 4 of Mental Hospital. J. A. Kenny and Partners, Consulting Engineers, 44 Kildare St., Dublin. Deposit £5.

June 5.—Newbiggin-by-the-Sea U.D.C. Electrical work in 50 houses being built on Spital estate. H. Selby Robson, Surveyor to Council, Council Offices. Deposit £2 2s.

June 6.—Belfast. Supply and erection of 33 kV and lower voltage cables for Victoria power station. Documents from Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-on-Tyne. Deposit £5 5s. (See April 24 issue.)

June 6.—Linlithgow T.C. Electrical work in erection of 34 houses on Mains Maltings site. N. S. Main, Town Clerk, Linlithgow.

June 6.—Mansfield T.C. Provision and erection of 94 concrete columns with 500 W tungsten lamps, lanterns, internal wiring, etc., for street lighting. Borough Engineer and Surveyor, Carr Bank. Deposit £2 2s.

June 6.—Shoreham-by-Sea U.D.C. Supply of electrical goods for installation of lighting in 44 houses. Applications to Surveyor, J. Dunn, 31 John St.

June 7.—Clyde Navigation Trust. Supply of cables, lamps and welding electrodes for stores from July 1. Stores Superintendent, No. 1 Graving Dock, Glasgow S.W.1.

June 9.—Durham. Installation of 34 street lighting units in New Elvet, Hallgarth St. and Church St., and nine fluorescent units in Saddler St. City Engineer, Town Hall. (See May 8 issue.)

June 9.—Holland. Installation of electricity at Boston St. Thomas school. County Architects, County Hall, Boston, Lincs.

June 9.—North Walsham (Norfolk) U.D.C. Electrical installation at White Horse Common, U.9, comprising 40 lighting points. J. A. Yates, Surveyor, Council Offices, New Rd. Deposit £1 1s.

June 9.—Stocksbridge U.D.C. Provision of electrical installations in 93 houses on Wilson Rd., Shay House and Royd estates. Council's Surveyor, D. E. Robinson, Town Hall, Stocksbridge, Sheffield.

June 11.—Merthyr Tydfil T.C. Supply of equipment for electrical engineering laboratory and electrical installations workshop for College of Further Education. T. S. Evans, Town Clerk, Town Hall.

June 13. Limerick. Supply of protected type electric power units to drive various items of quarry plant, and suitable for 3-phase, 380 V, standard frequencies, 50 c/s. County Council Secretary, 82 O'Connell Street.

June 14.—Chadderton U.D.C. Materials and works in new street lighting scheme comprise (*a*) supply of 49 lanterns, transformers, capacitors, time switches, fuses for 140 W sodium lamps; (*b*) supply of 49 concrete columns 25 ft high; and (*c*) erection of those columns. Engineer and Surveyor, Town Hall. (Advertised in this issue.)

June 14.—Cork (Eire). Electrical installation in buildings at hospital at Loto, Granmire. Nicholas Mathews, Consulting Engineer, 42 Fitzwilliam Pl., Dublin. Deposit £10 10s.

June 16.—Bristol. Supply of electrical stores for year ending June 30, 1953, for Cossham and Frenchay Hospital Management Committee. Secretary, Frenchay Hospital, Bristol.

June 16.—Ceiriog (Denbigh) R.D.C. Electrical installation in 40 houses and six shops with flats on Rhosywaen site, Chirk. R. W. Aubrey, Surveyor, The Mount, Chirk. Deposit £1 1s.

June 16.—Fife. Electrical work in public health clinic at Cowdenbeath. Surveyors are Robt. Calbreith and Lawson, 21 Crossgate, Cupar.

June 16.—Oldbury T.C. Provision and erection of 26 concrete street lighting columns with time switches, h.p.m.v. discharge lamps in Class A, and for fixing only of lanterns and auxiliary equipment. Borough Surveyor, Municipal Bank Chambers. Deposit £2 2s.

June 18.—Burton-on-Trent T.C. Replacement of 43 lamps and conversion from gas to electricity in various streets. Borough Surveyor, Town Hall. (See May 22 issue.)

June 18.—High Wycombe T.C. Supply and erection of (*a*) steel columns (from stock) and installation of auxiliary equipment, lanterns and wiring, etc.; and (*b*) supply of lanterns, 400 W mercury lamps and sets of auxiliary apparatus for street lighting along trunk roads A.40 and A.4010. J. A. Parkinson, Borough Engineer and Surveyor, Municipal Offices, Queen Victoria Rd. Deposit £2 2s. (See May 22 issue.)

June 20.—Belfast. Supply of electrically wound solar dial time switches. Electricity Dept., East Bridge St. (Advertised in this issue.)

June 20.—Londonderry. Complete electrical installation at Garvagh House. J. R. W. Murland, Consulting Engineer, 13 Wellington St., Belfast. Deposit £3 3s.

June 23.—Manchester. Supply of electric machines and machine tools for Newall Green Secondary School, Wythenshawe. City Architect, Town Hall. Deposit £1 1s.

June 23.—Wanstead and Woodford B.C. Installation of 160 W blended lighting in Group B on 23 routes. Included: (*a*) provision of lanterns, control gear and fittings for extension and conversion to electric lighting of about 270 existing gas columns and same for about 100 gas columns; and (*b*) provision and erection of about 70 concrete columns with lanterns and control gear. Borough Engineer and Surveyor, Municipal Offices, High Rd., Woodford, E.18. Deposit £2. (See May 22 issue.)

June 30.—Stockport T.C. Rewiring, lighting and electrical installation at Town Hall. Wm. F. Gardner, Borough Surveyor, Town Hall. Deposit £5 5s. (Advertised in this issue.)

July 7.—Dublin. Electrical installation at Dublin Regional Sanatorium, Blanchardstown. P. D. Cinneide, Dept. of Health, Custom House. Deposit £20.

July 16.—Gloucester. Supply and installation of two electrically driven well pumps at Newent station. Pumps to be driven by shafts from vertical motors on surface. J. H. Goodridge, City Surveyor and Water Engineer, 21 Eastgate St. Deposit £2 2s. (Advertised in this issue.)

No date stated.—Southampton. Supply of six electrically driven pumps for installation at proposed pumping station, Chapel. Details from Borough Engineer, Civic Centre.

OVERSEAS

Details of items marked may be obtained on application to the Board of Trade, Horseguards Avenue, S.W.1, quoting reference.*

June 24.—Uruguay. Ferrocarril Central del Uruguay invites tenders for supply of 7,500 metres of cables to various specifications. Address of above is Calle Le Paz 1095, City. B.o.T. (Ref.: CRE 17773/52).* Tenders also invited for supply of 27,700 metres l.t. cables for electric signalling-overhead lines. (These are separate tenders.) B.o.T. (Ref.: CRE 17772/52).*

June 25.—Uruguay. Supply of batteries of accumulators for telephone exchanges—each supplied with stand and accessories including densimeters, thermometers, spare glass box, etc. Gerencia Administrativa de la U.T.E., Paraguay 2431, Montevideo. B.o.T. (Ref: CRE 17705/52).*

June 26.—Uruguay. Supply of six pedestal drilling machines, column type, to take twist drills up to 25 mm and powered by 3-phase electric motor with four speeds between 50 and 700 r.p.m. Usinas Electricas y Telefones del Estado, Paraguay 2431, Montevideo.

June 27.—Uruguay. Supply of 9000 metres of non-metallic covered cable, 14 junction boxes and accessories for Usinas Electricas y Telefonos del Estado, Paraguay 2431, Montevideo. B.o.T. (Ref.: CRE 17669/52).*

June 30.—N. Rhodesia. Municipality of Livingstone invites tenders under specification No. L.S.2/1952 for 11 kV and l.v. cables, overhead lines and switchgear. Consulting Engineer, J. S. Clinton, P.O. Box 4648, Johannesburg. Deposit £3 3s.

June 30.—Uruguay. U.T.E. require an overhead crane with full equipment for electrical operation on 3-phase 220 V 50 c/s supply (motors, conductors, control cabin, etc.). B.o.T. (Ref.: CRE 17752/52).*

July 8.—India. Indian Railways have issued details of their requirements in rolling stock during the years 1953-54. Quotations to "Railway Board" c/o High Commissioner for India, India House, Aldwych, W.C.2. B.o.T. (Ref.: CRE 18098/52).*

July 16.—Australia. State Electricity Commission of Victoria requires supply of 22 kV rewirable drop-out expulsion switch fuses and fuse-elements. Secretary of Commission, 22-32 William St., Melbourne. B.o.T. (Ref.: CRE 18232/52).*

Your Queries — Answered

"Bandalasta" lighting fittings, suppliers of? W.W.—Brookes & Adams, Ltd., Barr St., Hockley, Birmingham. (23049)

"Elexcel" cookers, etc., address for spares? N.W.—Selex Electric Co., Ltd., Yardley Rd., Kirby Trading Estate, nr. Liverpool. (23056)

Incinerators, makers of? E.G. — Jackson Electric Stove Co., Ltd., 143 Sloane St., S.W.1; Saniguard Appliances, Ltd., 62 London Wall, E.C.2; Hyginette Mfg. Co., 39 Victoria St., S.W.1; Euk Catering Machinery, Ltd., 6 Avonmore Rd., W.14; Applied Heat Co., Ltd., Elecfurn Works, Watford By-Pass, Watford. (23064)

"L.E.C." refrigerators, makers of? S.E.—Longford Eng. Co., Ltd., 14-20 Longford Rd., Bognor Regis, Sussex. (23075)

Door bolts, electrically operated, makers of? E.A.—Sterdy Telephones Co., Ltd., 180 Tottenham Court Rd., W.1; Cox Walkers, Ltd., Darlington. (23084)

"Batterymex" batteries, makers of? M.E.—We presume this refers to "Batrymax": Ever-Ready Co. (Gt. Britain), Ltd., Hercules Place, N.7. (23091)

Waterproof switches, 1 or 2 amp. d.p., makers of? W.C.—A. F. Bulgin & Co., Ltd., By-Pass Rd., Barking, Essex offer to try to assist. (23098)

The above are selected from questions we have answered this week. If you have a query, send it to us.

July 16.—Uruguay. Supply of diesel motor generating set of about 3 kW for continuous current of 110 V with accessories; nine electric radiators similar to the ... for hot-water heating of 70 ... / each; and one heliocoidal ventilator with ½ h.p. motor, for orifice of about 0·40 m in diameter. Administracion Nacional de Puretos. B.o.T. (Ref. CRE 15788/52).*

Aug. 8.—Australia. Brisbane City Council invites tenders for supply of 33 kV cable, pilot cable and jointing material. Copies of specification may be had from Chief Engineer and Manager, Dept. of Electricity, Kelvin House, Adelaide St., Brisbane. Cost 10s. 6d. B.o.T. (Ref. CRE 18050/52).*

No date stated.—Australia. First stage to begin of proposed 3,000 MW hydro-electric development of Snowy, Murray and Tumut Rivers, and tenders invited for supply, erection and maintenance of generators and turbines comprising four 3-phase 50 c/s vertical shaft Francis-type water wheel-driven generators each having continuous maximum rating of 80,000 kW for power station on Tumut River by Snowy Mountains H.-E. Authority. London office: 18 St. George St., Hanover Sq., W.1. Closing date for tenders expected to be in October.

CONTRACTS PLACED

Burnley T.C. Electrical work at new High School at Ivy Bank, Leeders Electrical Services Ltd., £7,271; also installation of electric light at St. Stephen's school, A. Webster and Sons (Burnley) Ltd., £1,350.

Chatham T.C. Erection of 85 street lamps in Walderslade Rd., S.E. Electricity Board, £4,392.

Grimsby T.C. Electrical installation to workshop block of College of Further Education, B.C.S. Electrics Ltd., £6,464.

Newmarket U.D.C. Electric wiring of 128 houses in Exning Rd., R. B. Vaissiere, £1,437.

Plymouth. An illumination scheme, S. Western Electricity Board, £1,189.

Preston and Chorley (Lancs). Supply of electric lamps for year ending Mar. 31, 1953, for Hospital Management Committee, Siemens Electric Lamps and Supplies, Ltd.

Scunthorpe T.C. Electrical installation in 152 houses, G. W. Kemshall, £4,291.

PRICES OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	231 0 0	£220 0 0
LEAD, good soft pig (foreign)	129 0 0	120 0 0
,, ,, ,, "English" quality ...	130 10 0	
Tin (99·99·75%) ... ...(Cash)	969-971	—
,, (3 months)	958-959	—
ALUMINIUM, commercial purity (del.)	154 0 0	—
ZINC	166 0 0	156 0 0
ARMOURING:		
Galv. Steel Wire (0·104 in.) ...	57 10 0	—
Mild Steel Tape (0·04 in.)	39 15 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Dean Bros and Walker. Partnership between John R. Dean, Percival W. Dean and John C. Walker, electricians of Bury, Sussex, dissolved as from May 24, so far as it concerns P. W. Dean who retires.

Fashionwood Fittings, 22 Elm Rd., Leigh-on-Sea. Bernard Dyer, James Whale, Arthur G. Miller, Edward W. Martin and Stanley D. Allen, trading in partnership as electrical fitting manufacturers. Partnership dissolved as from Mar. 1. Debts received and paid by S. D. Allen, who will continue the business.

Pathfinder Refrigeration, Ltd. Resolution for winding-up passed at meeting on May 19 and Brian Tooke, C.A., Salisbury Sq. House, Salisbury Square, E.C.4, was appointed liquidator. Creditors are asked to send particulars to him by June 20.

F. W. Sims and Co., electrical engineers and contractors of 30a Surbiton Rd., Kingston-on-Thames. Partnership between George A. J. Bullett, Francis R. J. Sims (snr.), Francis R. J. Sims (jnr.) and Raymond L. Buzzing dissolved as from May 14. Debts received and paid by G. A. J. Bullett, F. R. J. Sims (snr.) and F. R. J. Sims (jnr.), who will continue the business.

BANKRUPTCY ACTS

Receiving Orders

Carlisle. George Scott Graham, electrical engineer, trading at Blackfriars St., Carlisle. Date of receiving order, May 15.

Kendal. George H. Measures, electrical goods dealer of Enville House, 10 Ziskey Howe Terrace, Windermere. Date of receiving order, May 19.

Application for Discharge

Liverpool. Ernest Whitehouse, electrical engineer, trading at 29 Westfield St., St. Helens. Hearing fixed for June 13 at the Court House, Fruit Exchange Buildings, Victoria St., Liverpool.

Dividends

Birkenhead. William B. Johnson, trading as "Fluorescent Neon Display Co." at 114a Brighton St., Wallasey. First and final dividend of 1s. in £ payable at 5 Rumford Place, Chapel St., Liverpool, on June 3.

Gt. Grimsby. Thomas G. Evett, trading as "Evetts," electrical contractor at 3 Lindsey Rd., Cleethorpes. Supplemental dividend of 2.312d. in £ payable on June 3 at Official Receiver's Office, 8 Flottergate, Gt. Grimsby.

Newcastle-on-Tyne. George S. Douthwaite, electrical engineer trading as G. S. Douthwaite and Co. at 25 Dean St., Newcastle. Second supplemental dividend of 8d. in £ payable on June 5 at Official Receiver's Office, Gibb Chambers, 54 Westgate Rd., Newcastle.

Portsmouth. Walter J. R. Ashley, trading as Southern Wireless Services at 151 London Rd., North End, Portsmouth. First and final dividend of 20s. in £ payable to Official Receiver's Office, 16 Westwood Rd., Southampton, on June 9.

Voluntary Liquidation

Knight's (Hendon), Ltd., electrical contractors. At meeting of creditors statement of affairs disclosed liabilities of £16,501 of which £13,065 was due to trade creditors. Assets shown at a book value of £11,245 were estimated to realise £6,092 and after allowing £360 for preferential claims, there were net assets of £5,732 or a deficiency of £10,769. A note on statement explained that director's loans amounting to £3,068 had been withdrawn. Resolutions passed confirming voluntary liquidation of company with David Morgan, acc., of Morgan and Co., 100 Park St., Grosvenor Sq., W.1, as liquidator, with committee of inspection.

BUSINESS PROSPECTS

HOME

Ashford (Kent) U.D.C. Erection of 86 houses on Great Burton estate. J. Sudlow, Clerk of Council, Council Offices, Church Road.

Aylesbury. W. H. Murad is to build factory at Stocklake.

Bangor. Welsh Regional Hospital Board are considering sites at Penrhyn Park and Penrhosgarnedd for new general hospital.

Barking. T.C. recommended to approve factory extensions in Alfred's Way for A. F. Bulgin and Co. Ltd., same at Fresh Wharf for Quality Confection Ltd., and also in Alfred's Way for F. Goymer. They have also been asked to approve installation of fluorescent lighting at Dawson schools at estimated cost of £1,200.

Birmingham. Erection of 38 dwellings at West Heath and 6 at Selly Oak. H. J. Manzoni, city engineer and surveyor, Civic Centre.

Bolton T.C. Erection of 180 houses and flats on Bailey Lane estate, Breightmet. Housing Director, Town Hall.

Burton-on-Trent T.C. Tenders likely to be invited soon for erection of 28 flats on Balfour St. site. Also for about 460 dwellings on Eton Rd. site.

Camberwell B.C. Construction of 21 houses, 3 flats and 6 shops on site No. 51. Council's Architects, John Grey and Partner, 17 Buckingham St., Strand, W.C.2.

Cardiff. Construction of primary school at Fairwaer. Architects are T. Alwyn Lloyd and Gordon, 6 Cathedral Rd.

Chichester. National Printing Ink Co. Ltd. propose additions to factory in Terminus Rd. Architect is E. Brian Taylor, Midland Bank Chambers.

Cleethorpes T.C. Erection of 54 dwellings on Beacon Hill site. A. B. Cooper, Borough Engineer, Council House.

Colne Valley U.D.C. Erection of 24 houses at Marsden. Architect is Noel Heppenstall, 135 Armitage Rd., Milnsbridge, Huddersfield.

Coventry. Plans have been prepared for rebuilding the railway station. First stage will probably start this year.

Dorking T.C. Plans approved for 71 dwellings at Westcott.

Durham. E.C. has decided to spend £400 renewing electrical installation in S.E. Divisional Education Offices.

Gateshead. Plans approved for R.C. church at Sheriff Hill. Architect is Robert Burke, 10 Lampton Rd., Jesmond, Newcastle.

Gloucester. Renovations to be carried out this year by B.R. at Central Station. Also R.D.C. has approved erection of 362 houses at Brockworth for A. W. Hawksley Ltd. Provision has been made at Brockworth for a total of 500 houses as well as church, schools and shops.

Hampshire. Revised school building programme provides for erection of 5 primary and 3 secondary schools at estimated cost of £520,000.

Leeds. Tenders likely to be invited soon for erection of 93 flats on Belle Isle, Seacroft, Moortown and Moorfield estates.

Naas (Kildare) U.D.C. Erection of 122 houses and four dwellings with shops on Canal site. J. P. Whyte, Town Clerk, Council Offices, Town Hall.

Narberth (Pemb) R.D.C. Erection of total of 79 houses on nine sites. C. Glynne Jones, Clerk, Council Offices, High St., Narberth.

North Cotswold R.D.C. Erection of total of 60 houses on various estates. Apply to Thomas Rayson, 29 Beaumont St., Oxford, in respect of 52 houses, and to Pemberton and Bateman, Chart. Architects, 21 Vine St., Evesham, concerning remainder.

Osgoldcross (Yorks) R.D.C. Construction of 22 houses at Monk Fryston. J. W. Bland, clerk of council, Tanshelf House, 15 Front St., Pontefract.

Perth T.C. Application to be made for sanction to borrow £1,209 for installation of electric light in houses at Tulloch Terr. and Tulloch Place.

Redcar T.C. Erection of two blocks of four shops and maisonettes on Dales estate. Borough Engineer, Municipal Bldgs.

Ripponden U.D.C. All trades in erection of 23 houses at Northfield. Clement Williams and Sons, Architects, Permanent Chambers, Commercial St., Halifax.

Tynemouth. T. B. Bilton and Son are to build a factory in Hudson St., North Shields. Architect is W. Stockdale, 73 Howard St., North Shields.

Westmorland. Construction of Kirkby Stephen secondary school. Names to R. H. Crompton, County Architect, County Hall, Kendal.

Westport (Mayo) U.D.C. Tenders to be invited shortly for erection of 60 houses on Demesne site.

Whitehaven. Work expected to start this year on a £377,000 college of further education. Architect is G. K. C. Smith, of County Architect's staff.

Wigan T.C. Tenders expected to be invited soon for erection of primary school, and application to be made for sanction to borrow £251,226 for erection of 172 houses at Pemberton.

OVERSEAS

Ceylon. K. V. G. de Silva, 86 Trincomalee St., Kandy, are now interested in expanding activities to cover agencies for electrical goods.

Cuba. World Export and Import Co. of Mercaderes 2, Havana, wish to contact U.K. manufacturers of pressure cookers, absorption-type refrigerators and dry-cell batteries for radios and flashlights.

Venezuela. National Institute of Public Health Works, Caracas, wish to establish direct contact with U.K. makers of plant and equipment for water treatment, air compressors laboratory equipment and electric-driven water pumps.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Brush in design. 674,909. Class 9. Electric apparatus for use in operating machines engines and motors by current control and reactors, battery chargers, etc. Brush Electrical Eng. Co., Ltd., Falcon Works, Nottingham Rd., Loughborough, Leics.

Ferrosonic with design. B701,906. Class 9. Sound recording and reproducing apparatus, sound records, and tapes, films, etc. British Acoustic Films, Ltd., 37,41 Mortimer St., W.1.

Transbooster with design. B700,910. Class 9. Voltage regulating apparatus. Westinghouse Brake and Signal Co., Ltd., 82 York Way, King's Cross, N.1.

TRADE NOTES

Metal Prices Down. As from May 22 the price of imported good soft pig lead dropped by £2 to £129 per ton delivered, and at the same time the price of good ordinary brand zinc was reduced by £24 to £166 per ton delivered.

New Phone No. The telephone number of Enfield Cables, Ltd., at Victoria House, Southampton Row, W.C.1, has been changed to Holborn 9292.

Change of Address. The London section of the Publicity Department of the English Electric Co. is now located at Marconi House, 336-7 Strand, W.C.2. Tel.: Temple Bar 1577.

Disclaimer. Pooley and Austin, Ltd., wholesale electrical distributors, who have been established since 1907 and now trade at 77 Great Peter Street, London, S.W.1, ask us to correct any impression that they are connected in any way with any other company trading as wholesale electrical distributors or with any firm having electrical contracting or retailing interests.

Holidays. The factory of Mersey Cable Works, Ltd., will be closed from July 14 to July 26, inclusive, for the annual holidays

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London, W.C.2.

A. H. Bancroft and Co. Ltd., 534 Streatham High Rd., S.W.16. Motor, mechanical, electrical, precision and general engineers and contractors, etc. Cap.: £1,000. Dirs.: A. W. H. Bancroft and Mrs. B. V. Bancroft.

Bracewell and Prior Ltd., 25 St. James St., Bacup, Lancs. Manufacturers of and dealers in wireless goods, radio receivers and transmitters, television sets, etc. Cap.: £6,000. Dirs.: S. Bracewell, K. R. Bracewell, A. Brown and H. Larter.

Davell and Co. (London) Ltd., 61a Bathurst Mews, Bathurst St., W.2. Merchants, factors, brokers; importers and exporters of, dealers in and agents for machinery, including electrical plant, prime movers, packaging and paper working plant. Cap.: £300. Dirs.: C. Pretzlik, F. R. Fox-Davies and G. Cornu.

Electrical Contractors (South Devon) Ltd., 41 Portland Sq., Plymouth, Devon. Cap.: £1,000. Dirs.: W. T. Cline, C. E. J. Penrose, H. F. Cousins, P. S. Heuth, S. V. Wise and nine others.

Electrocoils Ltd., 71 Edmund St., Birmingham 3. Manufacturers of and dealers in coils, armatures, electric control gear, etc. Cap.: £100. Dirs.: F. D. Clough and B. J. E. Bruce.

Telecyco Ltd., 79 Denmark Hill, S.E.5. Radio, television and electrical engineers and contractors, etc. Cap.: £1,000. Dirs.: A. E. Dunn, J. E. Cook and H. W. Davies.

MEETINGS TO NOTE

FRIDAY, MAY 30.

INCORP. PLANT ENGRS. (Birmingham Branch).—"Refrigeration." A. C. Curgenvom. Imperial Hotel, 7.30 p.m.

WEDNESDAY, JUNE 4

FOURTH INTERNATIONAL MECHANICAL ENGINEERING CONGRESS.—Opens at Stockholm and continues until June 10.

MECHANICAL HANDLING EXHIBITION.—Held at Olympia from today until June 14.

TUESDAY, JUNE 10

INCORP. PLANT ENGRS. (London).—"Boiler Water Conditioning: particularly priming and foaming and difficulties due to carry-over." G. S. Irving. Royal Soc. of Arts, 7 p.m.

B. I. CALLENDER'S CABLES

Substantial Turnover Increase

THE seventh annual general meeting of British Insulated Callender's Cables Ltd. will be held on June 12 in London.

The following is an extract from the circulated statement of the chairman, Sir Alexander Roger, K.C.I.E.:

In the parent company, profit on trading has risen by £1,352,629 to £4,585,668, mainly due to the substantial increase both in the volume and value of our output for 1951, the advantages of a full order book, and the benefits of a constant improvement in methods and machines.

Taxation requires £2,707,881 or £643,244 more than in 1950.

Your directors decided some months ago that further permanent capital was required in the business, and decided to obtain this by the offer to existing Ordinary stockholders of £3,109,614 of Ordinary capital on what we consider to be attractive terms. As is now well known, the issue was an outstanding success and has brought in some £3,340,000 of new cash.

I welcome the initial steps taken by the present Government to control expenditure and, through some small relief in personal taxation, to give some encouragement to greater endeavour. But I most fervently hope that further and stronger action will soon be seen under both these heads.

The introduction of copper rationing at the end of 1950, the shortages which have persisted throughout the year of this and such other vital materials as steel, the inadequate supply of skilled engineering personnel, and our endeavours to deal equitably with the competing demands for our products, are the main factors which have combined to make 1951 a year of many problems to our production organisation. It has been impossible to overcome wholly certain shortages and to keep pace with the demands for all our products. By increasing the output of others, through making the best use of available resources, introducing in certain instances new or substitute materials, and obtaining the benefits of the constant improvement and expansion of our incentive schemes and plant efficiency, we have, however, been able to achieve a gradually increasing overall volume of production.

We have made a satisfactory start to 1952. Sales for the three months to March 31, 1952, show a marked improvement over those for the first quarter of 1951. We have also a full order book and altogether the prospects for 1952 look good provided our essential raw materials continue to be made available to us.

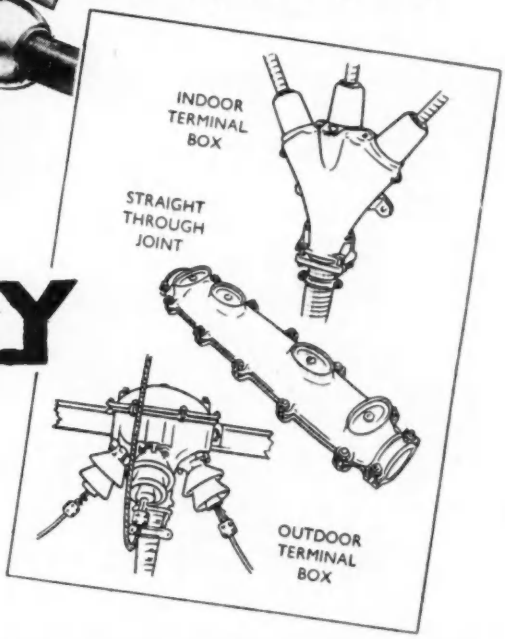
Henley's provide a dependable range of distribution equipment for indoor and outdoor installations.

Examples of equipment for 3,300 to 11,000 volts are illustrated below. Please write for catalogues in which you are interested.

Catalogue 31
Straight Through Joints

Catalogue 32
Indoor Terminal Boxes

Catalogue 33
Outdoor Terminal Boxes (Inverted)



HENLEY

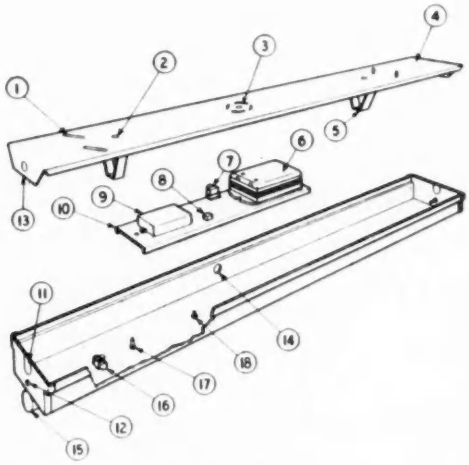
DISTRIBUTION EQUIPMENT for 3,300-11,000 volts

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD. 51-53 HATTON GARDEN, LONDON, E.C.1

A new range of fittings for fluorescent lamps

This entirely new range of Metrovick fluorescent fittings is based on a standard channel with interchangeable reflectors.
Different styles of reflectors are readily attached to the channel and for stocking and transport they can be nested together and easily stacked.
No live parts are exposed when the reflectors or enclosures are removed for cleaning.
All the fittings are constructed of sheet steel, bonderised and stove enamelled. They are complete with lampholders and wiring and unless it is stated otherwise they are supplied complete with auxiliary gear either for switch start or instant start as required.

A complete unit
(Closed-end metal trough)



Exploded view of Basic Channel for Metrovick Fluorescent Fittings

Easily stocked
Easily erected
Easily maintained

Send for leaflet 4121/21-2

1. Fixing slots for close ceiling mounting.
2. ¾ in. conduit knockout for conduit or chain suspension.
3. B.S. conduit box entry.
4. Backplate.
5. Bracket for securing channel to backplate.
6. MRJ Choke.
7. Starter switch and socket.
8. Terminal block and earthing terminal.
9. Capacitor.
10. Gear tray.
11. ¾ in. conduit knockout for end entry.
12. Screws for attaching endplates.
13. ¾ in. conduit hole to terminate end entry.
14. Starter hole.
15. Flicker shield.
16. Oddie Clip holding reflector.
17. Captive screw for channel fixing.
18. Stud for fixing gear tray.

METROVICK

METROPOLITAN-VICKERS ELECTRICAL COMPANY LTD., ST. PAUL'S CORNER, 1-3 ST. PAUL'S CHURCHYARD, LONDON, E.C.4.

Member of the A.E.I. group of companies

S/F105

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WANTED · FOR SALE WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

CHADDERTON URBAN DISTRICT COUNCIL

STREET LIGHTING

TENDERS are invited for the following materials and works in connection with a new Street Lighting Scheme:—

Contract No. 4.

SUPPLY of 49 enclosed LANTERNS, TRANSFORMERS, CAPACITORS, TIME SWITCHES and FUSES for 140 watt Sodium Discharge Lamps.

Contract No. 5.

SUPPLY of 49 25 ft. Mounting Height Reinforced Concrete Street LIGHTING COLUMNS.

Contract No. 6.

ERECTION of 49 25 ft Mounting Height Reinforced Concrete Street LIGHTING COLUMNS.

Specification and Forms of Tender may be obtained upon application to the Engineer and Surveyor, Town Hall, Chadderton.

Tenders enclosed in a plain sealed envelope endorsed "Street Lighting—Contracts 4 to 6" are to be delivered to the undersigned by June 14, 1952.

L. STOTT,
Clerk of the Council.

Town Hall,
Chadderton.
May, 1952. (S 392)

CITY OF BELFAST

Electricity Department

TIME SWITCHES

TENDERS are invited for the SUPPLY and DELIVERY of electrically wound solar dial time switches.

Form of Tender and specification (No. G.175) may be obtained at the Electricity Department, East Bridge Street, Belfast.

Each Tender, in sealed envelope marked "Tender for Time Switches, Electricity Committee," and endorsed with the name and address of the tenderer, must reach the undersigned not later than 4 p.m. on Friday, June 20, 1952.

An official receipt must be obtained for each Tender delivered by hand. Tenders sent by post should be registered.

The lowest or any Tender will not necessarily be accepted.

JOHN DUNLOP,
Town Clerk.

City Hall,
Belfast.
May 19, 1952. (S 393)

COUNTY BOROUGH OF STOCKPORT

TO ELECTRICAL CONTRACTORS

THE TOWN HALL COMMITTEE invites Tenders for the LABOUR and MATERIALS required in the re-wiring and lighting and management of the electrical installation (first section, lower ground floor) at the Town Hall, Stockport.

Drawings, specifications and forms of tender may be obtained on application to Wm. F. Gardner, M.I.C.E., Borough Surveyor, Town Hall, Stockport, on payment of a fee of five guineas made payable to the County Borough of Stockport, which will be returned on the receipt of a bona fide tender, or, on return of the documents.

Tenders with all the relevant documents enclosed in a sealed cover and endorsed "Town Hall, Re-wiring and Lighting," must be delivered to the undersigned not later than Monday, June 30, 1952.

The Committee do not bind themselves to accept the lowest or any tender.

WM. F. GARDNER, M.I.C.E.,
Borough Surveyor.

Town Hall,
Stockport. (S 430)

GLOUCESTER CORPORATION WATER UNDERTAKING

ELECTRICALLY DRIVEN WELL PUMPS, NEWENT PUMPING STATION MODERNISATION

TENDERS are invited for the SUPPLY AND INSTALLATION of two electrically driven well pumps at the above station, and incidental work in connection therewith. The pumps are to be driven by shafts from vertical motors on the surface. The capacity of each pump will be 42,500 gallons per hour and the total motor h.p. to be installed will be approximately 200.

Conditions of contract, specification, schedule of prices and form of tender may be obtained from J. H. Goodridge, A.M.I.C.E., A.M.I.W.E., City Surveyor and Water Engineer, 21 Eastgate Street, Gloucester, on payment of a deposit of two guineas, which will be refunded on receipt of a bona fide tender (not subsequently withdrawn).

Tenders sealed and endorsed "Contract No. 16 Wa—Pumping Plant at Newent Pumping Station" must be received by the undersigned not later than 12 noon on Wednesday, July 16, 1952.

The lowest or any tender will not necessarily be accepted.

L. O. NEED,
Town Clerk.

Guildhall, Gloucester. (S 352)

APPOINTMENTS VACANT

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

SOUTH AFRICA

SKILLED CABLE JOINTERS required for Transmission and Distribution System in the Electricity Undertaking at Cape Town.

Applicants must have served a recognised apprenticeship and have had subsequent training and experience in the jointing of extra high tension and low tension cables. Experience in the making of joints in oil and/or gas filled 66 kV cables will be a recommendation.

Pay from 3s. 9d. per hour for 46 hour week plus Cost of Living Allowance at present £4 17s. 1d. per week for married and £2 2s. per week for single men. Paid holidays and sick leave, pension scheme. Apply first at any Employment Exchange, quoting reference No. O.M.P. 1217/52.

DAVIS & SOPER LTD.,
Agents to the City Council of Capetown.

52 and 54 St. Mary Axe,
London, E.C.3.
May 21, 1952. (S 396)

MIDLANDS ELECTRICITY BOARD

JUNIOR ENGINEER required in the Technical Section of the Birmingham and District Sub-Area Headquarters. Applicants should have received a good general training in the electricity supply industry. Technical qualifications desirable. Salary £415-£507 per annum (N.J.B. Grades "N" 20 to 16), according to qualifications and experience. Superannuable.

Apply within seven days to Emil Braathen, Sub-Area Manager, Birmingham and District Sub-Area, 14 Dale End, Birmingham 4.

A. STEPHENS,
Secretary.
(S 388)

CENTRAL ELECTRICITY BOARD
FEDERATION OF MALAYA

ASSISTANT POWER STATION SUPERINTENDENT (M28769B) and TURBINE ROOM SUPERINTENDENT (M28771B)

required by the **Central Electricity Board, Federation of Malaya.** Option of appointment, either (a) on agreement for 3 years in the first instance, leading, subject to satisfactory service, to an offer of permanent employment on the pensionable establishment, with opportunity of terminating appointment at the end of the first year's service if so desired, or (b) on contract for 7 years with leave on full pay after one tour of 3 to 4 years and a gratuity on satisfactory completion of final service at the rate of £70 for each completed period of 3 months' service. Commencing salary according to qualifications, war service and experience, in scales shown below. Additional allowance payable to married men according to dependants. Free passages. Liberal leave on full salary. ASSISTANT POWER STATION SUPERINTENDENT. Salary (including allowances) payable in local currency equivalent at present Government rate of exchange to £1,799 rising to £1,988 a year. Candidates must have wide experience of station maintenance and operation and preferably have held a similar position in a steam power station of not less than 80 MW capacity or as a charge engineer for at least 5 years in a station of not less than 120 MW capacity.

TURBINE ROOM SUPERINTENDENT. Salary (including allowances) payable in local currency equivalent at present Government rate of exchange to £1,610, rising to £1,988 a year. Candidates must have had considerable specialised experience in the repair and maintenance of steam turbines, preferably of Parsons type, and should have served a good works apprenticeship on steam turbine or turbo-alternator manufacture. They should preferably be Corporate Members of the Institute of Mechanical or Electrical Engineers or of the Institute of Marine Engineers or hold a Higher National Certificate or a 1st Class M.O.T. Steam Certificate, but candidates not so qualified would be eligible for salary on a lower scale equivalent to £1,596, rising to £1,757 a year.

Apply at once by letter, stating age, full names in block letters, and full particulars of qualifications and experience, and mentioning this paper, to the Crown Agents for the Colonies, 4 Millbank, London S.W.1, quoting on letter the reference number against the appointment for which application is made. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. (S 404p)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

ELECTRICAL MAINTENANCE ENGINEER
Staff Vacancy No. 51 52

APPLICATIONS are invited for the position of Electrical Maintenance Engineer at Lincoln generating station.

Candidates should have had a thorough training and possess considerable experience in the maintenance of all types of electrical equipment found in modern generating stations. Preference will be given to engineers who possess a Higher National Certificate in Electrical Engineering.

The salary will be in accordance with Class "F," Grade 6, of the National Joint Board Schedule A, and the appointment will be pensionable within the provisions of the British Electricity Authority and Area Boards' Superannuation Scheme.

Forms of application may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and should be returned not later than June 17, 1952.

L. F. JEFFREY,
Divisional Controller.

May 23, 1952. (S 422)

BRITISH ELECTRICITY AUTHORITY

London Division

JUNIOR ENGINEER
Blackwall Point Generating Station

APPLICATIONS are invited for above superannuable post.

Qualifications—sound technical training and preferably have reached Higher National Certificate standard in electrical engineering, or equivalent. Previous experience in generating station an advantage.

Duties include operation and control, under supervision, of generating plant, and good opportunities are offered for gaining experience with modern P.F. boilers, turbines and auxiliary plant. Applicants must be prepared to accept shift duties if required.

Salary and conditions of service in accordance with N.J.B. agreement, Class "F," Grade 14, £456 p.a.

Applications, stating age, qualifications and experience, to Divisional Secretary, B.E.A., London Division, Ergon House, Horseferry Road, S.W.1, within 14 days of this advertisement. (S 423)

CROWN AGENTS FOR THE COLONIES

TELECOMMUNICATIONS ENGINEER required by Government of Nyasaland for the Posts and Telegraphs Department for one tour of 24 to 36 months. Commencing salary according to age and experience in scale £770 rising to £1,304 a year (including cost-of-living allowance). Outfit allowance £50. Free passages. Liberal leave on full salary. Candidates must have a sound practical and theoretical knowledge of internal and external telecommunications engineering and be capable of supervising the installation of V.H.F. radio equipment; automatic telephone exchanges and switchboards; subscribers' installations; trunk line and subscribers' line construction; installation of carrier equipment, various types, V.F. and D.C. telegraphic equipment. Applicants who are on the staff of the General Post Office should submit their applications through official channels.—Apply at once by letter, stating age, full names in block letters, and full particulars of qualifications and experience, and mentioning this paper to the Crown Agents for the Colonies, 4 Millbank, London S.W.1, quoting on letter M.28792.A. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. (S 421)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

APPLICATIONS are invited for positions as DRAUGHTSMEN or SENIOR DRAUGHTSMEN in (a) the Mechanical Engineering Section and (b) the Civil Engineering Section, of the Chief Generation Engineer's (Construction) Department at Wolverhampton. N.J.B. service conditions, superannuable appointments, salaries in accordance with Schedule "D": Senior Draughtsmen, Grade 5, £547 to £651 and Engineering Draughtsmen, Grade 6, £413 to £547.

Applicants for (a) should have experience in the layout and design of generating stations, or generating plant, including boilers, turbo-alternators, and ancillary equipment, and for (b) experience in the layout and design of heavy structural steelwork, or of civil engineering and building works for generating stations, including reinforced concrete work.

Forms of application available from Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, to be returned completed by June 14, 1952.

F. W. LAWTON,
Divisional Controller.
(S 395)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following superannuable positions. Salaries and conditions of service will be in accordance with the National Joint Board Agreement.

SHIFT CHARGE ENGINEER
Ipswich Generating Station

Applicants should have had sound technical training and practical experience in the operation of steam generating plant and switchgear. Salary Class "D," Grade 7, £613-£623 p.a.

MAINTENANCE ENGINEER (ELECTRICAL)
Cliff Quay Generating Station

Applicants should have had a good technical education, extensive experience in the maintenance of the electrical equipment in a modern generating station. Salary, Class "J," Grade 6, £858-£893 p.a.

JUNIOR ENGINEER
Cliff Quay Generating Station

Salary, Class "J," Grade 18, £375–Class "J," Grade 14, £524 p.a.

JUNIOR ENGINEER
Norwich Generating Station

Salary, Class "F," Grade 15, £375–Class "F," Grade 14, £447 p.a.

The duties of the successful applicants will include assisting in the control room on shift and other operational and investigational duties. Preference will be given to applicants who have had previous experience in a generating station and who have reached the standard of the Ordinary National Certificate in Electrical Engineering or its equivalent.

Applications, stating age, qualifications and experience should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, by June 7, 1952.

W. N. C. CLINCH,
Controller.
(S 408)

SOUTHERN ELECTRICITY BOARD

INSTALLATION ASSISTANT
(Amended Notice)

BASINGSTOKE DISTRICT of No. 3 (Portsmouth) Sub-Area. Salary, N.J.B., Class "D," Grade 11, Column 1 (£480 per annum), N.J.B. Conditions of Service.

Applicants should have had experience in the preparation of specifications and estimates for all types of electrical wiring installations, and should be competent to supervise electricians and organise the allocation of work.

The successful candidate for the above appointment will be required to contribute to the B.E.A. and Area Boards' Superannuation Scheme, if eligible.

Applications, on the standard form obtainable from the Sub-Area Secretary, Lower Drayton Lane, Cosham, Portsmouth, and returned to him in envelopes suitably endorsed, not later than June 14, 1952.

F. W. KEMPTON,
Secretary.
May 29, 1952. (S 419)

MIDLANDS ELECTRICITY BOARD

Birmingham and District Sub-Area

REQUIRED, A GENERAL ASSISTANT ENGINEER in High Voltage Planning Section of the Sub-Area the Engineer's Department. Extensive experience required in preparation of specifications, lay-out of substations, and the planning of, and analysis of loading conditions on, high voltage transmission and distribution systems. Technical qualifications desirable. Salary £672-£693 p.a. (N.J.B., Grade N.13), superannuable.

Apply within 14 days, stating age, experience, salary and position, to Emil Braathen, Manager, Midlands Electricity Board, Birmingham and District Sub-Area, 14 Dale End, Birmingham 4.

A. STEPHENS,
Secretary.
(S 406)

NORTH WESTERN ELECTRICITY BOARD

APPOINTMENT OF DISTRICT ENGINEER
BURY DISTRICT

DUTIES will include the control of the district engineering and drawing office staffs and responsibility for the construction, operation and maintenance of the district distribution systems (overhead and underground). Corporate membership of the I.E.E. will be an advantage.

Salary scale: £977—£1,020 p.a., grade F.2. N.J.B. Conditions.

Applications to Sub-Area Manager, No. 2 Sub-Area, The North Western Electricity Board, National Buildings, St. Mary's Parsonage, Manchester 3, by June 7, 1952.
(S 394)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the following posts in the Construction Department of the Division:

SECOND ASSISTANT ENGINEERS
(Civil) (Vacancy No. 44)

Applicants should hold a degree in Civil Engineering, be Corporate Members of the Institution of Civil Engineers or possess equivalent qualifications.

They should have had experience in the design and construction of heavy foundations, river works, structures in reinforced concrete and steel, and other civil engineering works associated with the design and construction of power stations.

Experience in the preparation of specifications, bills of quantities and estimates will be an advantage.

Salary will be within Schedule C, Class "AX DX," Grade 2 (£869 to £1,028 per annum) of the National Joint Board Agreement.

SECOND ASSISTANT ENGINEERS
(Mechanical) (Vacancy No. 45)

Applicants should hold a degree in Mechanical Engineering, be Corporate Members of the Institution of Mechanical Engineers, or possess equivalent qualifications.

They should be experienced in the design and construction of turbo-alternators, boilers, coal and ash handling plant, high pressure steam and water piping and other ancillary work.

Experience in the preparation of specifications and estimates and a knowledge of thermo-dynamics and hydraulics will be an advantage.

Salary will be within Schedule C, Class "AX DX," Grade 2 (£869 to £1,028 per annum) of the National Joint Board Agreement.

SECOND ASSISTANT ENGINEERS
(Electrical) (Vacancy No. 46)

Applicants should hold a degree in electrical engineering, be Corporate Members of the Institution of Electrical Engineers, or possess other equivalent qualifications.

They should have had experience in the design and installation of turbo-alternators, switchgear, transformers, and cables up to 33 kV and other electrical equipment associated with modern power stations.

Experience in the preparation of specifications and estimates will be an advantage.

Salary will be within Schedule C, Class "AX DX," Grade 2 (£869 to £1,028 per annum) of the National Joint Board Agreement.

CIVIL ENGINEERING DRAUGHTSMEN
(Vacancy No. 47)

Candidates should preferably have had experience in
(a) Design and detail of steel frame buildings, bridge and gantries, etc., or
(b) Design and detail of reinforced concrete structures, piled and slab foundations for heavy plant, culverts, cable subways, etc., or
(c) General buildings construction, drainage and sanitation schemes, associated with offices and administrative buildings.

MECHANICAL ENGINEERING DRAUGHTSMEN
(Vacancy No. 48)

Candidates should have had experience in the layout of boilers and turbines and auxiliary equipment. Condensing plant, coal and ash handling plant, h.p. and l.p. pipework installations.

ELECTRICAL DRAUGHTSMEN
(Vacancy No. 49)

Candidates should have had experience in the layout and installation of e.h.t. and l.t. switchgear, transformers, e.h.t. and l.t. cabling.

The salary for vacancies Nos. 47, 48 and 49 will be within Grade 5 (£547 to £651 p.a.) or Grade 6 (£413 to £547 p.a.), according to experience and qualifications.

The posts will be pensionable within the provisions of the Authority's Superannuation Scheme.

Applications should be submitted on the official form which may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, stating vacancy number, and should be returned not later than June 14, 1952.

L. F. JEFFREY,
Divisional Controller.
May 15, 1952. (S 373)

BRITISH ELECTRICITY AUTHORITY

North Western Division

MAINTENANCE ENGINEERS (ELECTRICAL) required at:—

Westwood Generating Station, Wigan (Vacancy No. 729).

Agecroft H.P. Generating Station, Salford (Vacancy No. 730).

Salary £762-793 (N.J.B., G. 6). Housing accommodation may be available at Westwood.—Apply, quoting vacancy number, to Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20, before June 7.
(S 410)

YORKSHIRE ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

No. 6 (Hull) Sub-Area

THIRD ASSISTANT ENGINEER
(Meters, Testing and Protection) (Vacancy No. 75/52)

Applicants should hold the Higher National Certificate in Electrical Engineering or its equivalent; have a good knowledge of protective gear—commissioning and maintenance, and some experience of high-voltage testing and cable-fault location.

Salary, N.J.B., Class "J," Grade 10, £660/£685 p.a.

Applications, stating the above vacancy number, and giving full details of age, qualifications, and experience, should be forwarded to the Manager, No. 6 (Hull) Sub-Area, Yorkshire Electricity Board, Ferensway, Hull, not later than June 12, 1952.

No. 3 (Sheffield) Sub-Area

ASSISTANT INSTALLATION ENGINEER
(Commercial) (Vacancy No. 75/52)

Applicants should possess a sound technical training, have served a full apprenticeship with a recognised firm of electrical contractors and subsequently have had a wide experience of all classes of electrical contracting work covering installations for lighting, heating and power.

Details should be given of experience in the following matters:—

Preparation of specifications, estimates and tenders for all classes of installation work. Application of I.E.E. Wiring Regulations and other relevant regulations covering electrical contracting work. Maintenance work including knowledge of rewinding and repair of electrical machinery. Layout and supervision of installations on site. Use of modern methods of estimating. Control of staff and workpeople.

Salary, N.J.B., Class "L," Grade 12, £647/£672 p.a.

Applications, quoting the above vacancy number and stating age, qualifications, etc., should be forwarded to the Manager, No. 3 (Sheffield), Sub-Area, Yorkshire Electricity Board, Commercial Street, Sheffield, not later than June 12, 1952.

No. 7 (Grimsby) Sub-Area

THIRD ASSISTANT ENGINEER
(Construction) (Vacancy No. 88/51)

Applicants should have had a sound practical training and experience in the operation, maintenance, planning and construction of high and low voltage underground and overhead networks, substation plant and ancillary equipment.

Preference will be given to candidates who are Corporate Members of the Institution of Electrical Engineers, or who hold certificates in electrical engineering.

Salary, N.J.B. Agreement, Class "G," Grade 10, £588/£610 p.a.

SECOND ASSISTANT DISTRICT ENGINEER
(Scunthorpe) (Vacancy No. 88/51)

Applicants should have had a sound practical training and experience in the operation, maintenance and construction of underground and overhead networks.

Preference will be given to candidates who hold certificates in electrical engineering.

Salary, N.J.B. Agreement, Class "E," Grade 7, £629/£660 p.a.

Applications, stating the above vacancy numbers and giving full details of age, qualifications and experience, should be forwarded to the Manager, No. 7 (Grimsby) Sub-Area, Yorkshire Electricity Board, Moss Road, Grimsby, not later than June 12, 1952. (S 407)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the following positions:—

Amended Advertisement

S/13.292/1. SYSTEM OPERATION LIAISON ENGINEER, Divisional Headquarters.

The successful candidate will be responsible for the liaison and co-ordination of operation between generating stations, transmission system and Board and Grid Controls at Bristol and London.

Applicants should be corporate members of the Institution of Electrical Engineers or hold equivalent qualifications.

Provisional Salary, N.J.B., AX—CX, Grade 2, £809-£1,000.

S/13.319. DRAUGHTSMAN (MECHANICAL), Divisional Headquarters.

Applicants should have had experience of work concerning Turbines and Auxiliaries, Boilers and Auxiliaries, Coal and Ash Handling Plant and Pipework.

Salary, N.J.B., Schedule D, Grade 6, £413-£547.

Application forms, which are obtainable from P. D. A. Oliver, Esq., Divisional Secretary, British Electricity House, High Street, Portsmouth, must be returned by June 13, 1952. (S 433)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

APPLICATIONS are invited for the following superannuable positions, subject to N.J.B. conditions:—

(a) TWO SHIFT CHARGE ENGINEERS at Nechells "A" power station, salary within Schedule A, Grade F7, commencing at £677 per annum. The station is temporarily graded Class "G."

(b) THREE STATION SHIFT CONTROL ENGINEERS, two at Nechells "B" and one at Hams Hall "A" power stations. Salaries within Schedule A, Grade J10, commencing at £660 per annum.

For (a) applicants should possess the Higher National Certificate in electrical or mechanical engineering, and should have had a sound technical training and practical experience in the control and operation of a large power station, including pulverised fuel fired boilers.

For (b) Higher National Certificate in electrical engineering or equivalent qualifications are required, together with sound technical training and practical experience in the control and operation of steam generating plant and main switchgear.

Application forms are available from the Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, and should be completed and returned by June 14, 1952.

F. W. LAWTON,
Divisional Controller. (S 420)

LONDON ELECTRICITY BOARD

ENGINEERS (OPERATION AND MAINTENANCE)

APPLICATIONS are invited for the above position in the following districts of the Northern Sub-Area.

Hackney/Stoke Newington

Applicants should have had a sound technical education up to at least National Certificate standard, preferably being corporate members of the I.E.E., and possess a practical experience of all branches of engineering work associated with the organisation of a District Distribution Department, particularly in regard to mains and substation work on d.c. and a.c. systems.

City

Applicants should have had a sound technical education up to at least National Certificate standard, with practical experience in general mains work, both d.c. and a.c., including installation and maintenance of distribution systems, also the preparation and keeping of associated records.

The posts are graded under Schedule A of the National Joint Board agreement: Hackney/Stoke Newington as Class "F," Grade 9, £616 7s. p.a., rising to £639 9s. p.a., inclusive of London allowance; City as Class "F," Grade 13, £471 p.a., rising to £490 p.a., inclusive of London Allowance.

Application forms, obtainable from Establishments Officer, 46 New Broad Street, E.C.2, to be returned by June 9, 1952, stating clearly district preferred and quoting ref. V/1461/2/T. on all correspondence. (S 409)

BRITISH ELECTRICITY AUTHORITY

South Wales Division

Vacancy No. 41/52.

APPLICATIONS are invited for the following superannuable appointments at the new Uskmouth Power Station, near Newport, at salaries in accordance with the N.J.B. Agreement.

1. STATION SHIFT CONTROL ENGINEERS. Class "K," Grade 10 (£699-£728 per annum).

2. JUNIOR ENGINEERS. Class "K," Grade 19/15 (£375-£524 per annum).

The classification will eventually be raised to Class "L."

Applicants for all these appointments should preferably have served a regular Apprenticeship and have obtained the Higher National Certificate. For appointment 1, applicants should have experience in the Control Room of a modern Power Station, and for 2 should preferably have received a manufacturing works training.

Forms of application, obtainable from the Divisional Secretary at the address below, should be returned by June 14, 1952.

H. J. BENNETT,
Divisional Controller.

British Electricity Authority,
Cardiff (Pengam Moors) Airport,
Cardiff.
May 24, 1952. (S 431)

APPLICATIONS are invited from ELECTRICAL CONTRACTS ENGINEERS for handling orders for steel works installations and other metal industries projects both as respects power units and associated control schemes. Preference will be given to applicants between 25 and 35 years of age who have served recognised apprenticeship, hold at least Higher National Certificate and have had previous manufacturing contractual experience. Permanent progressive positions, pension scheme. Successful applicants will have to find own accommodation, but for a limited period arrangements will, in appropriate cases, be made for special financial assistance.—Apply, stating age, qualifications, experience and quoting ref. 489C, to Central Personnel Services, English Electric Co., Ltd., 24/30 Gillingham Street, London, S.W.1. (S 426)

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

APPLICATIONS are invited for the position of EXPERIMENTAL ENGINEER in the Aircraft Test Laboratory of the English Electric Co. Ltd., at Warton, to work on the development and approval testing of aircraft electrical systems. Applicants should have at least H.N.C. and practical electrical or mechanical engineering experience.—Please write, giving full details and quoting Ref. 434H, to Central Personnel Services, English Electric Co. Ltd., 24/30 Gillingham Street, London S.W.1. (S 390)

APPLICATIONS invited for ASSISTANT PURCHASING OFFICER from men not more than 40 years of age who have had previous purchasing experience, preferably in lamp, valve and/or light engineering factories.—Box No. 1757, Electrical Times. (S 412)

ASSISTANT MECHANICAL ENGINEER wanted for large Power Plant equipped with h.p. Water Tube Boilers, Turbines, and up-to date auxiliaries. Applicants should have some years experience in this type of plant and possess a Higher National Certificate or its equivalent. Age not less than 32 or more than 45. Non-Contributory Pension scheme. Commencing salary £840. Position offers good prospects for a suitable man.—Reply to Box No. 1763, Electrical Times, quoting reference TME/2. (S 432)

ASSISTANT required for Sales Office. Experience of electricity metering practice essential. Must have sound technical knowledge of polyphase metering problems and experience in the preparation of tenders. Salary according to qualifications.—Write stating previous theoretic and practical experience to Aron Electricity Meter, Ltd., 72-82 Salusbury Rd., Kilburn, N.W.6. (S 401)

BRITISH ELECTRICITY AUTHORITY require a THIRD ASSISTANT ENGINEER to supervise the training of high pressure welders at a training centre which is to be established in London. Candidates should have technical knowledge and experience of both gas and electric welding, and be capable of instructing workmen on welding high-pressure pipes and receivers. The successful applicant will assist in setting up a workshop, and if necessary undergo a short period of training on the welding problems of the supply industry. Salary, N.J.B., Grade 4, £732-£954 p.a., including London Allowance.

Applications, stating age, qualifications, experience, present position and salary to D. Moffat, Director of Establishments, British Electricity House, Great Portland Street, London, W.1, not later than June 16, 1952. Quote reference AE.260. (S 414)

BRITISH ELECTRICITY AUTHORITY require a SECOND ASSISTANT ENGINEER (OVERHEAD LINES) in the Transmission Design branch at Headquarters, London. Candidates should have qualifications not less than A.M.I.E.E. standard and must be familiar with all aspects of design construction and maintenance of overhead lines and have good field experience of 132 kV steel tower line construction. Salary, N.J.B. Grade 3, £814 to £1,184 including London Allowance. Pension scheme.—Applications to D. Moffat, Director of Establishments, British Electricity House, Great Portland Street, W.1, not later than June 16, 1952. Quote reference AE.259. (S 405)

CONSULTING ENGINEERS' office has vacancies for young ENGINEERING ASSISTANTS who have graduated and served a recognised apprenticeship course in heavy power-plant engineering. Vacancies exist both for those who have just completed their apprenticeship and for those who have had further experience. Promising applicants who had received only a limited amount of works training may also be accepted and given further training within the organisation. Versatility and ability to think clearly are important for the work, which comprises a variety of engineering, scientific and economic investigations. Good commencing salary and prospects. Excellent working conditions.—Particulars, preferably typed, with covering letter in applicant's handwriting, to Merz and McLellan, "Millburn," Esher, Surrey. (S 295)

DRAUGHTSMEN required for cable-laying contract work, liberal subsistence allowance when working away.—Apply by letter in first instance to Contracts Department, Pirelli General Cable Works, Ltd., Leigh Road, Eastleigh, Hants. (S 378)

ELECTRICAL ENGINEER for Steelworks in Sheffield area. To be responsible to chief engineer for the installation and maintenance of electrical plant and equipment. Higher National Certificate in Electrical Engineering or equivalent qualifications essential.—Write giving full details of age, experience, qualifications and salary required to Box No. 1753, Electrical Times. (S 399)

ELECTRICAL INSPECTOR. The Ford Motor Co. Ltd., of Dagenham, Essex, have vacancy for man between 35 and 45 years of age. Should possess good general and technical education, with training in electrical engineering. Preference given to applicant experienced in installation, operation and maintenance of h.t. and l.t. substation equipment, paper cables and lighting and power wiring installation. Must be thoroughly acquainted with I.E.E. and Home Office Regulations.—Write, giving full details of education, qualifications, experience, and salary required, to Salaried Personnel Department, quoting reference T/El. (S 389)

ELECTRICAL WHOLESALERS require an ASSISTANT to the Sales Manager. Must have good knowledge of trade and conversant with catalogue compilation. Also, CLERK for Switchgear Department.—Apply, London Electrical Co., 92 Blackfriars Road, London, S.E.1. (S 435)

ENGINEER required for service in Uganda with electrical, mechanical and refrigeration experience. Duties will comprise the operation and maintenance of a large blast freezing and cold storage station, with power station and generating equipment. A good salary will be paid for a permanent post, carrying housing, leave and a normal overseas contract arrangements.—Applications should be sent to the undermentioned address, together with details of qualifications and experience, with copies of recent testimonials and should be posted so as to arrive not later than Monday, June 23, The Uganda Company (London) Ltd., 13 Rood Lane, London E.C.3. (S 413)

JUNIOR ELECTRICAL ENGINEER aged 22-30 required for Research and Development work in connection with electrical accessories, low tension switch and fusegear, etc. Must be capable of working on own initiative and running a small laboratory. London area. Applicants should have good educational qualifications, Higher National Certificate, Int.B.Sc. or Grad. I.E.E., and should preferably have served a recognised apprenticeship. Excellent prospects and a good salary is offered.—Write with full particulars to Box No. 1729, Electrical Times. (S 349)

JUNIOR METER TESTER required by English Electric Co. Ltd., Stafford; experience in single-phase meter test essential, polyphase meter experience an advantage. Progressive post for young man anxious to improve. Permanent position, good working conditions, canteen and dental facilities, non-contributory life insurance and pensions schemes, eligibility according to rules. Hostel accommodation available.—Apply, quoting Stafford Ministry of Labour Order No. 473, stating age and experience, to Ministry of Labour and National Service Office, Stafford. (S 305)

LEADING AND SENIOR DRAUGHTSMEN required for transformer work of the largest class.—Apply by letter, quoting "Transformer" and giving full details of age, experience and salary required to Staff Manager, General Electric Co., Ltd., Witton, Birmingham 6, through your nearest Employment Exchange. (S 304)

MAINTENANCE ENGINEER (MECHANICAL) required at Croydon "A" and "B" stations. Applicants should preferably possess B.Sc. degree or equivalent qualification and have had experience in the control of labour. Extensive experience in the maintenance of high-pressure turbine and boiler plant and power station auxiliaries. Salary, Class "K," Grade 6, £956 11s. p.a.

Application forms obtainable from Station Superintendent, Croydon "B" Power Station, Beddington Farm Lane, Croydon, Surrey, to be received not later than June 9, 1952. (S 424)

MIDLANDS AREA REPRESENTATIVE wanted by leading manufacturer of contactor gear, relays, rotary, tumbler and motor control switches. Established connection with electrical manufacturing concerns essential. The successful applicant will be required to join Staff and should possess own car.—Write stating experience, age and remuneration expected to Box No. 1749, Electrical Times. (S 397)

POWER STATION SHIFT CONTROL ENGINEERS required at the Margam works of The Steel Company of Wales Limited. Applicants must produce evidence of advanced technical education, and have experience in the control of an inter-connected H.T. network. Some experience in H.P. industrial boiler and turbine operation would be an advantage.

Salary, which is pensionable, according to age and experience. Applications should be in own handwriting addressed: The Personnel Superintendent, The Steel Company of Wales Ltd., Box No. 3, Port Talbot. (S 348)

REPRESENTATIVE required for Birmingham and the Midland counties. Applicants should have a good connection with electrical wholesalers and Area Board showrooms, and preferably possess a car.—Full details in strict confidence to Box No. 1755, Electrical Times. (S 411)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

SECOND ASSISTANT CHEMIST required at Croydon "A" Power Station. Applicants should preferably possess Inter B.Sc. (or equivalent) and should have had experience in fuel testing, water analysis and lubricating oil testing. Experience of modern power station installation an advantage.

N.J.B. conditions of service and salary, Class "F," Grade II, £528 to £545 per annum, plus 5% London allowance.

Applications on forms obtainable from Station Superintendent, Croydon "B" Power Station, Beddington Farm Lane, Croydon, Surrey, to be received not later than June 17, 1952. (S 387)

SENIOR AIRCRAFT ELECTRICAL DRAUGHTSMAN, having a thorough knowledge of A.P.970 electrical requirements and some knowledge of electronics. The vacancy is for a section leader and carries a good salary. Pension scheme. Accommodation assistance given in selected cases.—British-born applicants should send details of experience and qualifications to the Manager, Research and Armament Development Division, Heston Aerodrome, Hounslow, Middx. (S 427)

SENIOR ELECTRICAL ENGINEER required for Middle East duty by large Oil Company. Honours degree and/or A.M.I.E.E. essential, together with administrative experience and considerable technical practice in the lay-out, operation and maintenance of h.t. and l.t. systems from generation to end use. Desirable age limit 40. Generous allowance in addition to salary; pensionable post; biennial (paid) Home Leave.—Write quoting No. 206 to Box 5873 c/o Charles Barker & Sons Ltd., 31 Bridge Row, London E.C.4. (S 400)

THE ELECTRICITY CORPORATION OF NIGERIA has the following vacancies on its permanent and contract staffs in Nigeria:—

(a) SUPERINTENDING ELECTRICAL ENGINEER. Corporate member I.E.E. plus a degree in engineering, age 35-45. Overseas experience an advantage. Total salary and allowances £1,600 p.a. Probable permanent post.

(b) ELECTRICAL ENGINEERS. Corporate membership I.E.E. Experience in design of thermal and hydro stations and in transmission. Age 28-35. Salaries within range £1,000-£1,400, according to experience. Permanent posts.

(c) CIVIL ENGINEERS AND JUNIOR CIVIL ENGINEERS, with experience of power station design, thermal and hydro, or good general experience in reinforced and prestressed concrete work. Salaries within range £900 to £1,200 according to qualifications and experience. (These posts are on contract and not pensionable.)

(d) GENERAL ASSISTANT TO COMMERCIAL MANAGER. Preferably electrical/mechanical engineer. Experience in all branches of store replenishment and purchasing, both U.K. and Continental. Total salary £1,100-£1,250. Possible permanency.

(e) ASSISTANT STOREKEEPER. Fully experienced in electrical and mechanical stores. Total salary £890 to commence. Possible permanency.

These posts carry excellent conditions of service. Furnished quarters at low rental. Low Income Tax. Tours 18 to 24 months. Liberal leave on full pay. Good prospects in rapidly expanding electrical authority. Forms of application and full particulars from F. C. Inston, Liaison Officer in the United Kingdom, Electricity Corporation of Nigeria, The Corner House, Great Peter Street, London S.W.1. (S 425)

WANTED, energetic SALES MANAGER for light electro mechanical engineers in the north of England to develop sales of existing lines and to create markets for products in design stage. Only first class men with plenty of drive, initiative and engineering background, around 35 years of age should apply. Assistance with housing will be given and applicants should give full details of education, experience and salary required. Exceptional opportunity for the right man who will be required to visit Continent and U.S.A.—Write Box No. 1751, Electrical Times. (S 398)

BUSINESS PREMISES

LONDON, W.1

MODERN OFFICE and SHOWROOM BUILDING TO BE LET.

Floor area 15,500 sq. ft.

For particulars please apply to Box 1761, Electrical Times.

(S 429p)

COUNTY BOROUGH OF WALLASEY

LOCK-UP SHOP

17 Yew Tree Road, Moreton

TENDERS are invited for the TENANCY of the above shop for the purpose of carrying on any suitable trade, OTHER THAN any of the following:—

Butcher.
Grocer
Greengrocer and Fishmonger.
Chemist.
Baker and Confectioner.
Fish and Chips.
Newsagent, sweets and tobacconist.

The shop is one of a block of eight, seven of which are already occupied and used for the above-named trades.

Tenancies are for a period of fourteen years, with a break clause at the expiration of seven years, at the option of the tenant, and the tenders must be based on the terms and conditions laid down in the draft lease and schedule. Tenders with full particulars and order to view may be obtained from the Housing Manager, 150 Brighton Street, Wallasey.

The tenant will be required to provide and install usual fixtures to the satisfaction of the Borough Architect. Decorations will be carried out after tenant's fittings and fixtures have been installed.

Tenders to be delivered not later than Saturday, June 14, 1952, in the endorsed envelope provided, addressed to the Town Clerk, Town Hall, Wallasey.

The Council do not bind themselves to accept the highest or any other tender.

A. G. HARRISON,
Town Clerk.
(S 418)

APPOINTMENTS WANTED

CONTRACTING ELECTRICIAN, 31, exp. estimating, desires position anywhere in Gt. Britain in supervisory capacity which requires initiative, drive and imagination.—Box 1745, Electrical Times. (S 385)

WORK WANTED

A.C. and d.c. Motor Rewinds and Repairs. Prompt service, fully guaranteed. Edgware 8631 (4 lines).—Service Electric Co. Ltd., Stanmore, Middx. (D 324)

CASTINGS. Fisher Foundries Ltd., Greet, Birmingham, have capacity for brass, gun metal and soft grey iron machine moulded repetition castings weighing 1-30 lb. Loose pattern work up to 3 cwt. Delivery by road to all parts. Tel.: B'ham, Victoria 0197. (P 570)

COMPONENTS. Press tools and pressings for the electrical trades. Good deliveries.—Rutterford Bros., Wivenhoe, Essex (Phone 477). (S 338)

METALWORK. All types, cabinets, chassis, racks, etc., to your own specifications.—Philpott's Metalworks Ltd., Chapman Street, Loughborough. (P 695)

MIDLAND CONCERN manufacturing small PRECISION PARTS for textile machinery can undertake additional work. Mixed labour force highly suitable for light assembly of small mechanisms.—Box No. 1737, Electrical Times. (S 368)

PRESSINGS. Assemblies, wire work, spot and arc welding, capstan work. Quick service. Large quantities material available. Quotations by return. Specialists in sub-contract work.—Mountsorrel Pressings, 14-20 Loughborough Road, Mountsorrel. (S 299)

WANTED

A.C.—D.C. MOTORS, STARTERS, complete change-over installations, etc.—A.A. Electrical Co., Ltd., 67 Rothschild Road, Chiswick Park, W.4. Tel.: Chiswick 5105. (A 20)

ALTERNATOR, 150-200 kVA, 400 V, 3 ph., 50cy. Modern machine only and voltage regulator.—Thomas Ambler, East Ardsley Mills, Wakefield. Tel.: Morley 641. (S 428)

£50,000

Immediate cash available for purchase of New Ball and Roller Bearings, all types, Steel Balls and Rollers. Top prices paid, small quantities accepted.

CLAUDE RYE BEARINGS

895-921 Fulham Road, London, S.W.6

RENown 6174 (20 lines) (S 23p)

BALL, Roller and Taper Roller Bearings purchased. Good prices paid.—Offers to Berend and Berend Ltd., 62 Berners Street, London W.1. (R 333)

B.T.H. FREQUENCY CHANGERS. Type KVZ.3514, 3/2·35 kW, 400/3/50, 2,900 r.p.m.—Oldfield Engineering Company Limited, 96 East Ordsall Lane, Salford, 5. (S 402)

ONE PLATING GENERATOR having an output of 6 V, 6,000 amps. Price and delivery.—Oldfield Engineering Co., Ltd., 96 East Ordsall Lane, Salford 5. (S 370)

ONE SCREEN PROTECTED TYPE ALTERNATOR. Output any rating between 60-80 kW, 400 V, 3-phase, 50 c/s, 4 wires. Complete with exciter and control gear if available. Machine to be fitted with ball and roller type bearings and suitable for vertical mounting. Speed 750 to 1,000 r.p.m.—Oldfield Engineering Co. Ltd., 96 East Ordsall Lane, Salford 5. (S 369)

WANTED. ROTARY CONVERTORS, any size.—Universal, 221 City Road, London E.C.1. (A 16)

WANTED. Large quantity of 4-in. outside diameter TUBES from the dismantling of old Babcock Water-tube Boilers. Best prices paid. Prepared to purchase Babcock and Wilcox Water-tube Boilers for dismantling. —Apply, giving full details, to Midland Iron and Hardware Co., Cradley Heath. (A 5)

WANTED. MAWDSLEY GENERATORS, 65/85 V, 105 amps. 1,750/2,900 r.p.m., 6.75 kW.—C. G. and W. Young, 15 Colne Road, Twickenham. POP. 5168. (S 196)

WANTED for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of second-hand machinery and plant for re-use.—W. and H. Cooper Ltd., 176 Brady Street, Bethnal Green, E.1. (A 1)

WANTED. D.C. and A.C. ball-bearing MOTORS, MOTOR GENERATOR SETS, DYNAMOS and ALTERNATORS.—Full details to Britannia Manufacturing Co., Ltd., 22-26 Britannia Walk, London N.1. (A 13)

WANTED. Westinghouse STATIC CONVERTOR. Type 4 kVA, 288 R15.—Box No. 1743, Electrical Times. (S 381)

FOR SALE

CABLES & WIRE

CABLE 7·052 P.B.J., 100,000 yards for sale from stock.—S. G. Young, 154/6 Blackfriars Road, S.E.1. WATerloo 3131. (S 349)

DOMESTIC APPLIANCES

IMMERSION HEATERS, GRUBB. All ratings still available while stocks last in 14 in., 24 in., 26 in., 28 in and 30 in. Provision for intermediate loadings. Fully guaranteed. Immediate delivery.—Write for terms to Distributors, John Owner and Co. Ltd., Springfield Road, Birmingham 13. Tel.: Springfield 2939. (C 392)

ENGINEERING PLANT & MATERIALS

BRAND new piece sheet copper, 20 in. by 26 in. by 1/16 in., 45s.—G. Foley, Bridlington Rd., Driffield, E. Yorks. (S 434)

BRASS RODS BSS. 249
FROM STOCK, MOST SIZES AVAILABLE
from ½ in. - 2 in. dia.
DYAS & FOWLE
41 LOUDON ROAD, LONDON, N.W.8
Telephone: MAIDA VALE 5477, 5489, 8641.
(R 448p)

250,000
NEW BALL RACES, ROLLER, THRUST AND TIMKEN RACES in stock. Advise requirements.
CLAUDE RYE BEARINGS
895-921 Fulham Road, London, S.W.6
RENown 6174 (20 lines) (S 21p)

CASTINGS
Supplied in
GREY IRON and all Non - Ferrous METALS
Machining and Pattern Making
Enquiries Welcomed
DOVER INDUSTRIES LTD.
Eastern Docks, Dover
Telephone 582 (S 1p)

LIGHTING EQUIPMENT

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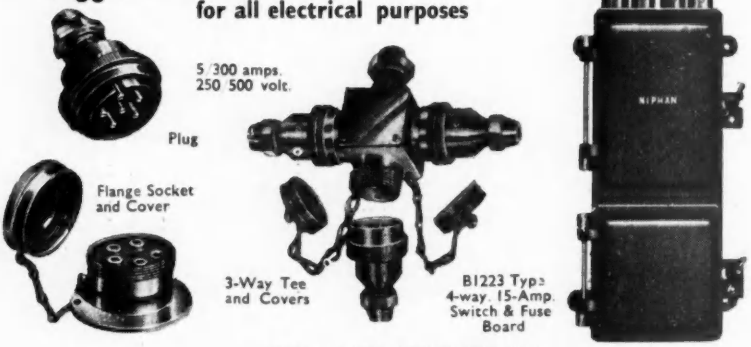

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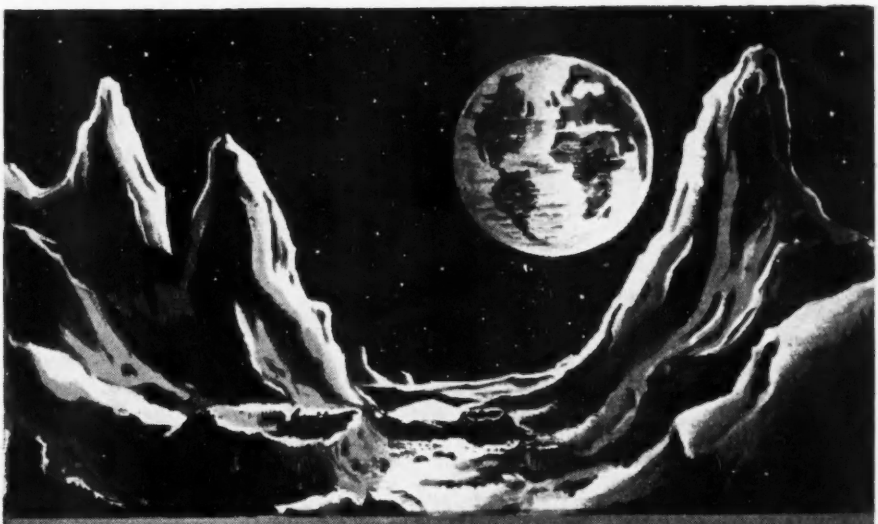

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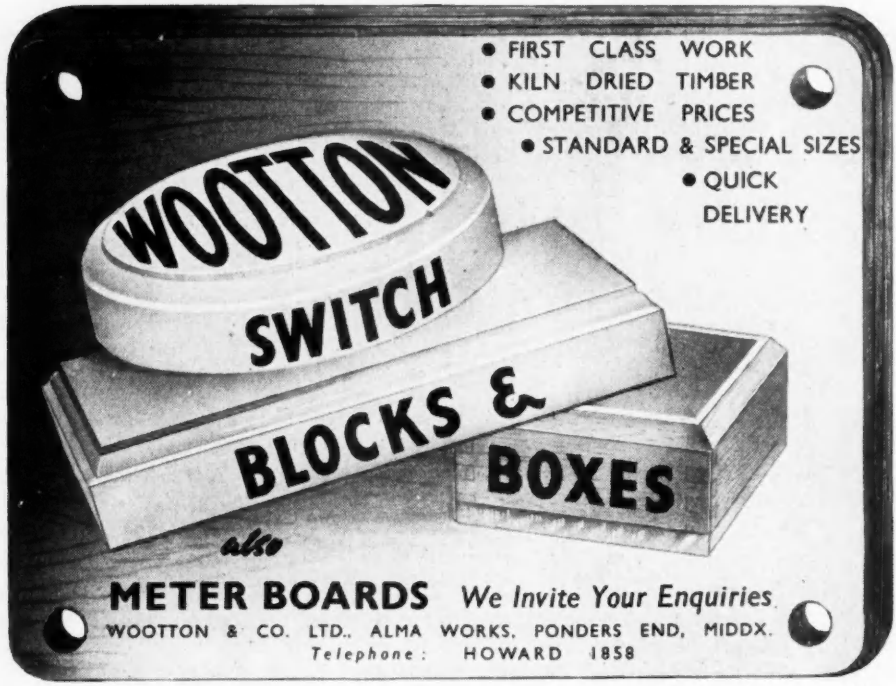

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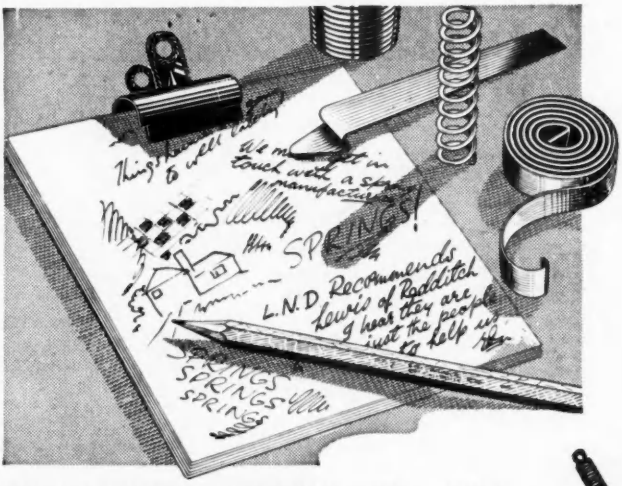

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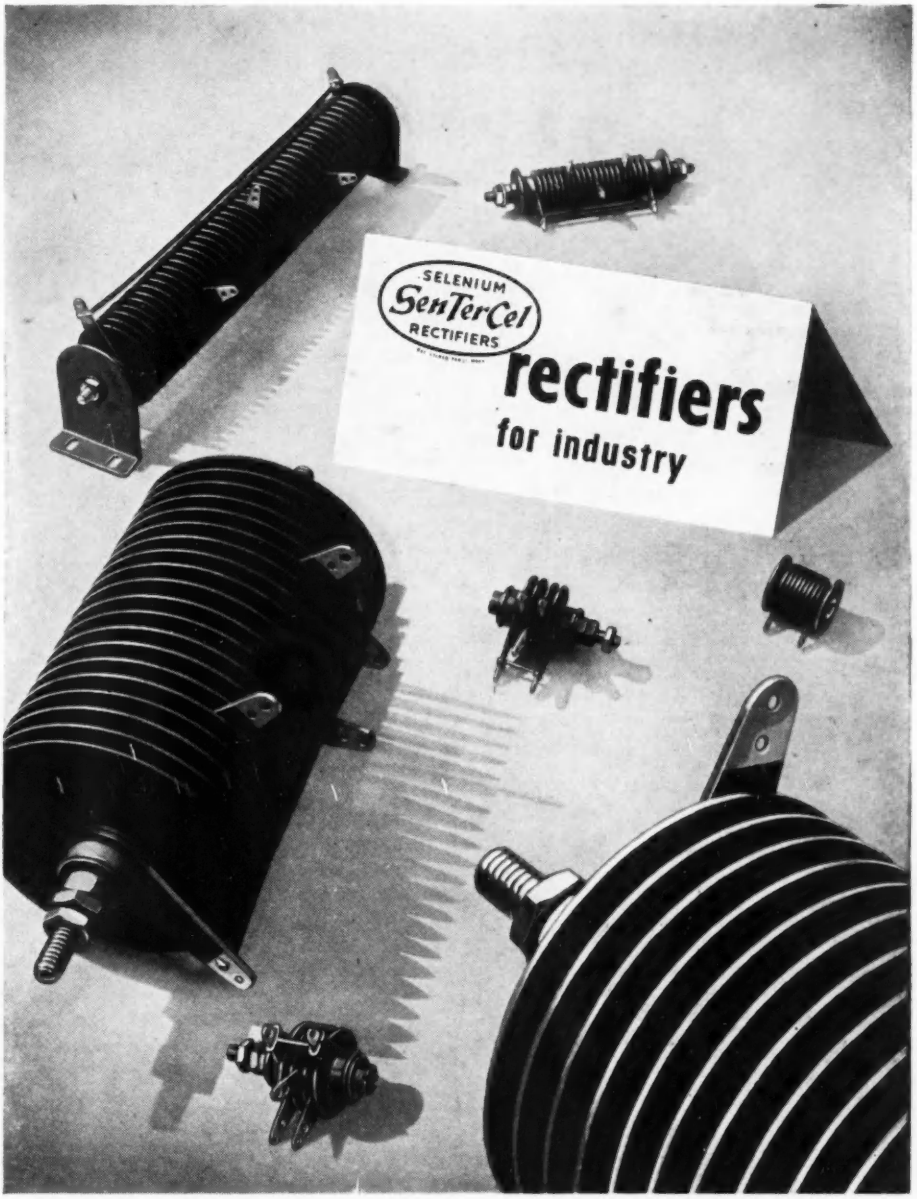

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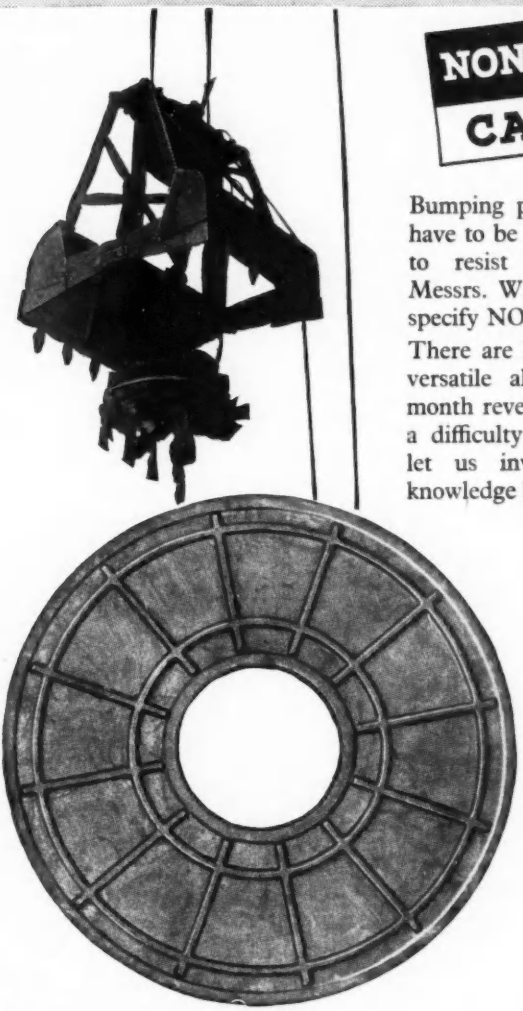

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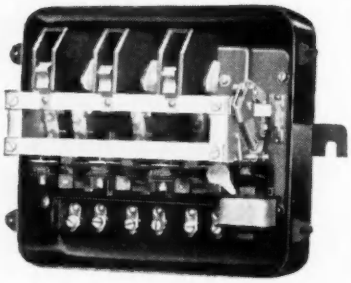

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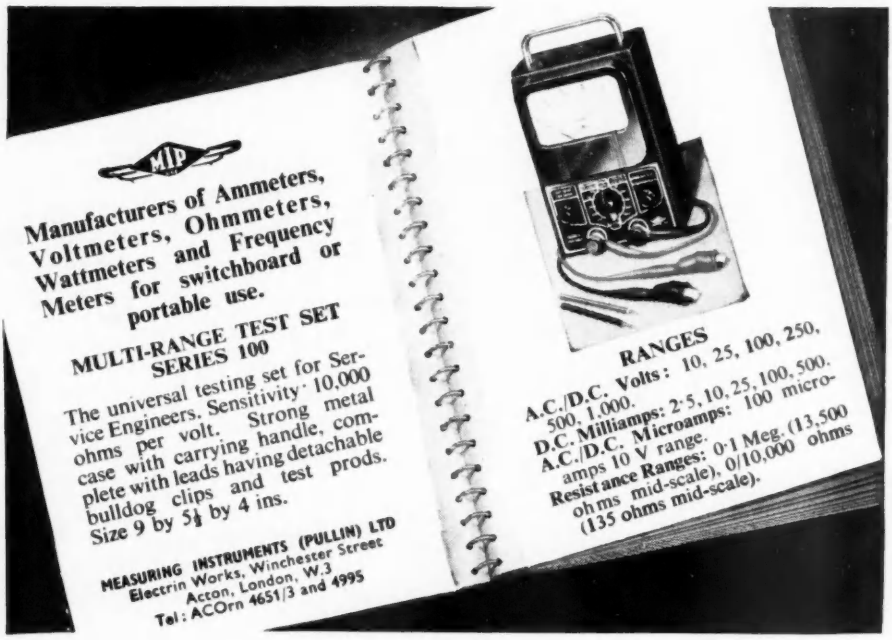
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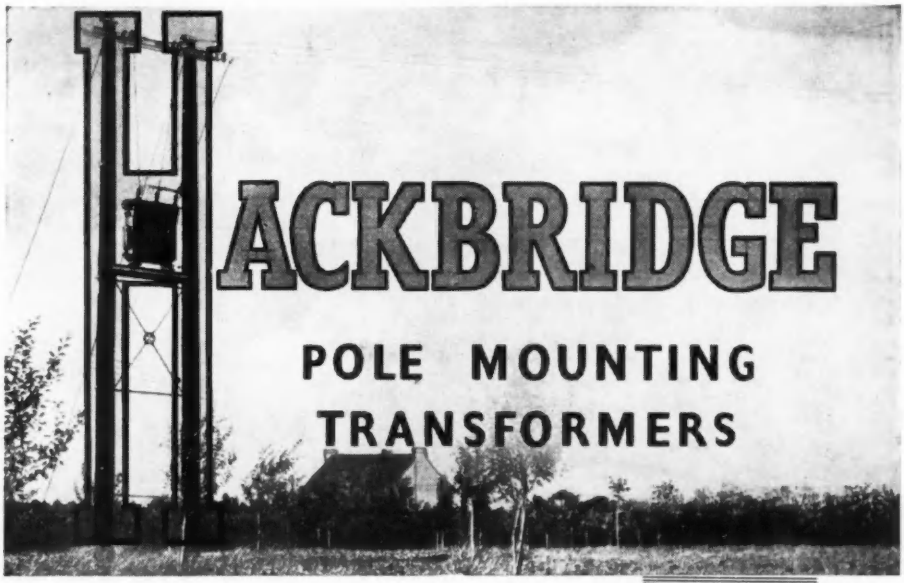

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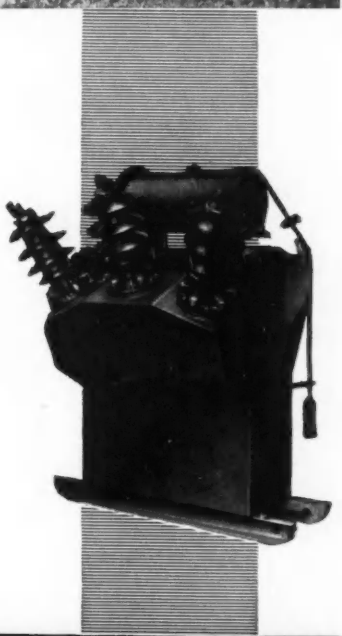

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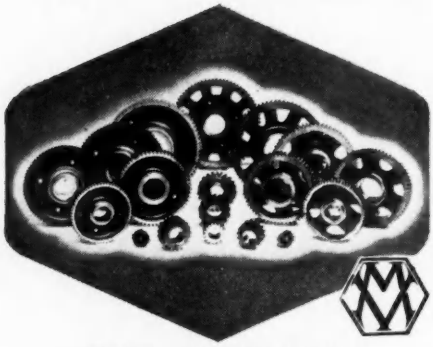

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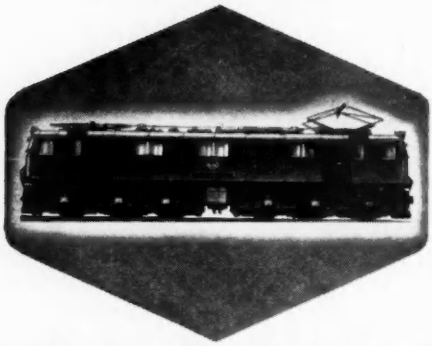

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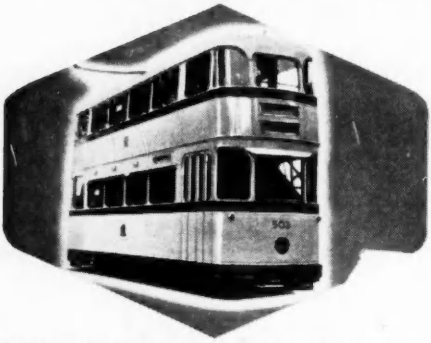

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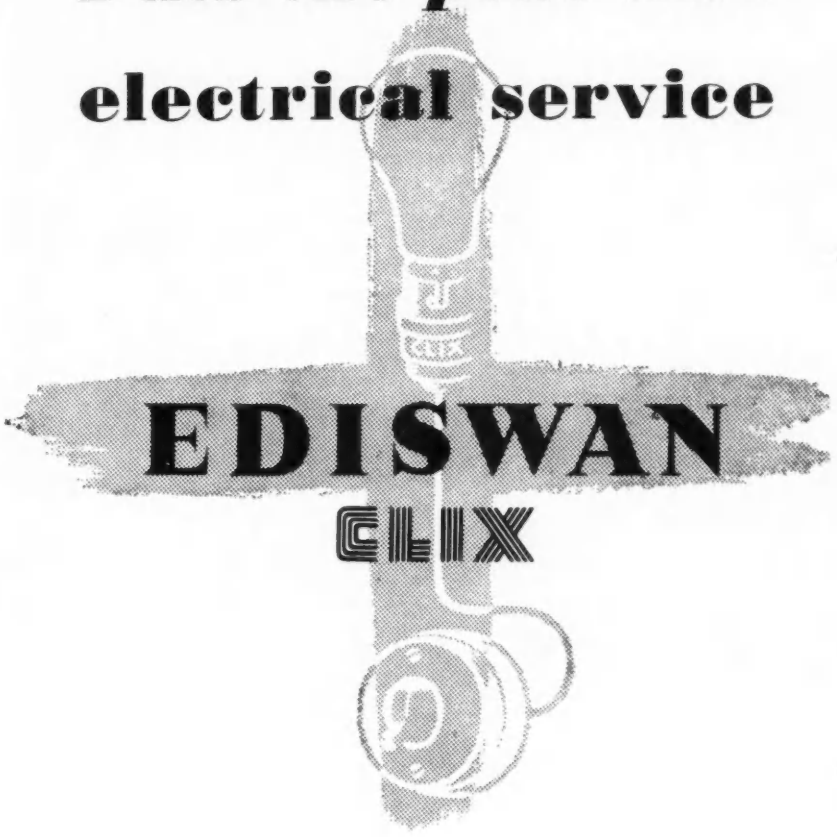

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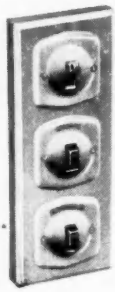

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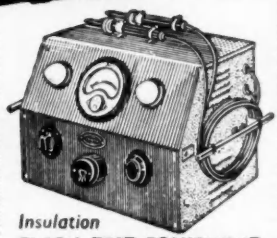

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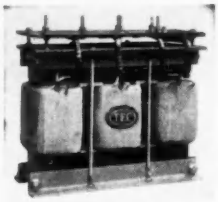

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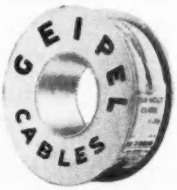

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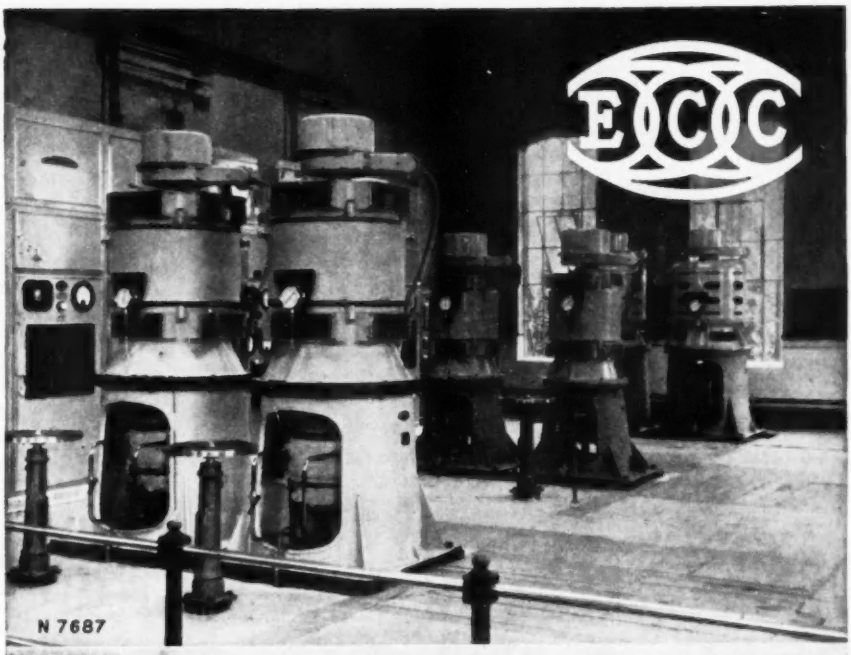

PUMPING WATER AT BIRMINGHAM

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Six vertical spindle centrifugal motors driving Sulzer pumps at Frankley Pumping Station.

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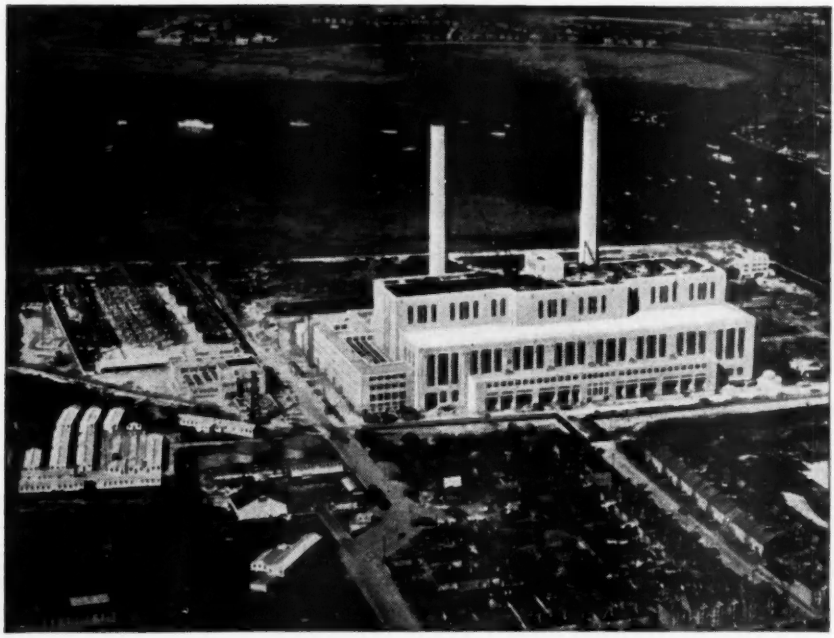

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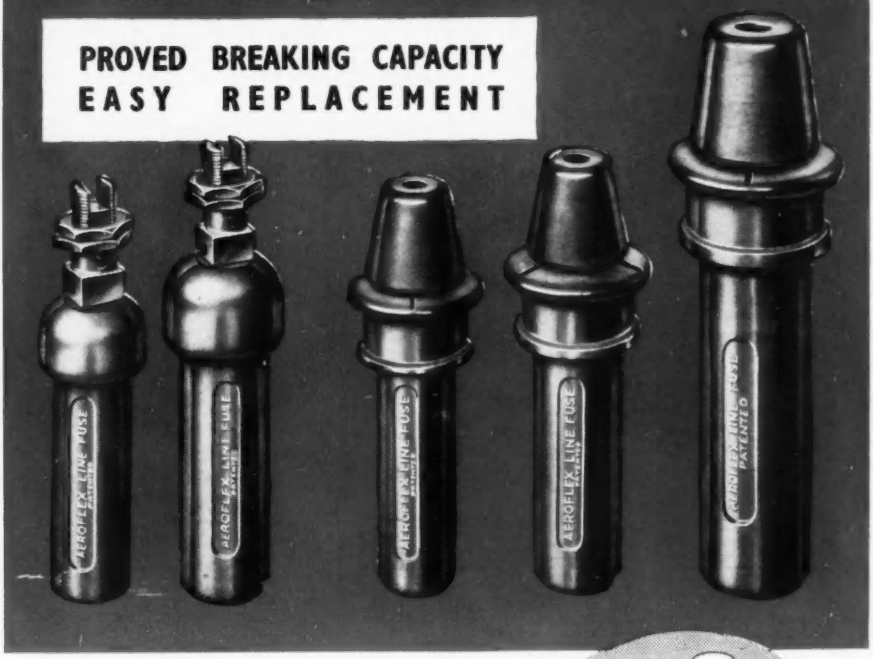

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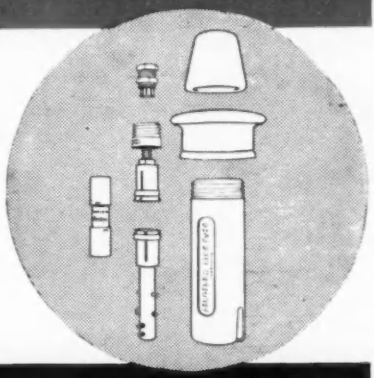

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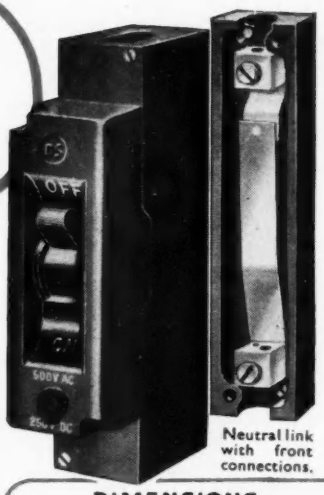

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